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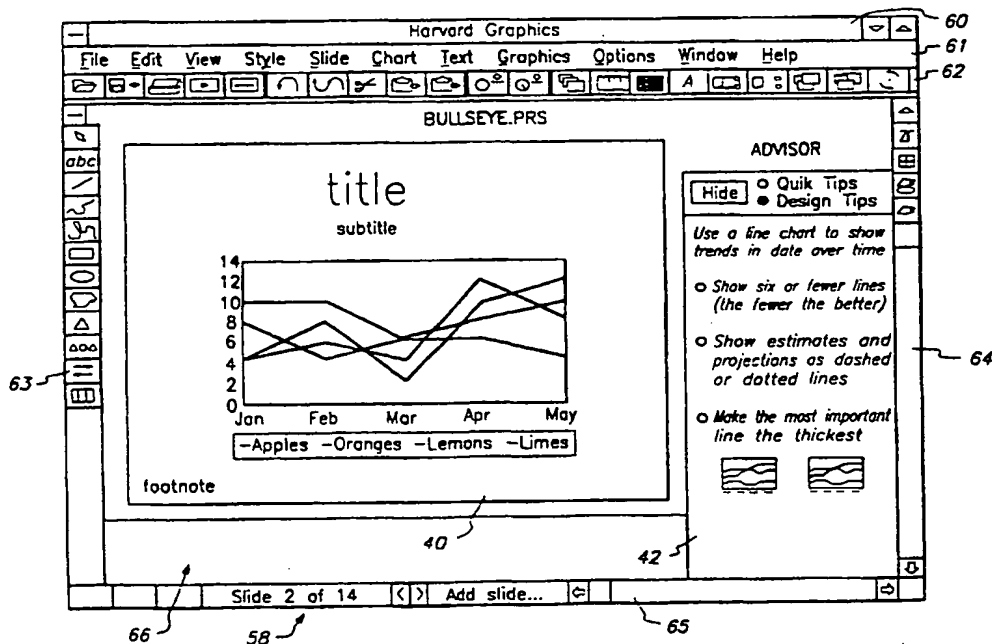
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(54) Title: SYSTEM AND METHODS FOR AUTOMATICALLY DISPLAYING GRAPHICAL HELP IMAGES ON A COMPUTER

(57) Abstract

A system for automatically presenting instructive graphical images and text comprises: a central processing unit, a display device, an input device, and memory. The memory further comprises an operating system, an application program, a plurality of bit map images, routines for displaying the bit map images based on cursor position, selection or context of operation. The routines are preferably executed concurrently by the system to display graphical help images and text on the display device. The display of the bit map images is performed automatically by the system that utilizes the context of operation of the application program, the position of the cursor or the command being selected as the input to determine the help image, if any, that is displayed. The present invention also comprises a plurality of methods for automatically displaying graphical images including: a method for displaying a graphical help image based on the context of operation of the application program, a method for automatically displaying a graphical help image based selection for modification of parameters; a method for automatically displaying a graphic image based on the position of the cursor; and a method for automatically displaying a help text based on the position of the cursor.



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System and Methods for Automatically Displaying  
Graphical Help Images On A Computer

Background of the Invention

5 1. Field of the Invention

The present invention relates generally to systems and methods for displaying messages that assist the user with operation of the computer. In particular, the present invention relates to a system and methods for displaying text and graphical representations to assist the user during operation of a presentation graphics program on a computer.

10 2. Description of the Related Art

The use of personal computers along with a variety of application programs for spreadsheets, word-processing, and presentation graphics has become widespread. These computers and application programs are used to create, revise and edit a variety of files, documents, and charts. Since their introduction, these application programs have become increasingly complex with the addition of many more features and capabilities. While the addition of these new features and capabilities allow the user to manipulate data and graphic images in many different ways, the addition of more new features is making these programs increasingly more difficult for the user to operate as desired. Moreover, in many application programs, the more advanced features are not effectively utilized because of lack of user knowledge and difficulty of operation. Thus, there is a need for a system that make these complex applications easier to use.

25 The prior art has attempted to make the applications more usable by providing on-line help. Many application programs include help systems that provide detail about the functions and features of a particular application as well as instructions for executing such functions and features. However, prior art help systems are little more than an indexed user's manual that is accessible on-line as part of the application program. Moreover, the prior art help systems provide the help information as text on the display device. Such help systems are of minimal benefit and do not fully address the problems with the increased complexity in application programs. One of the problems with these help systems is identifying the function or feature that is appropriate for the particular task the user is performing. The help systems are typically indexed text. In order for the user to identify functions, the user must make an inquiry in the help system and identify the function. However, in the majority of instances when the user needs help, the name, or even existence, of the feature

is unknown. Thus, existing help systems are not fully effective in detailing the full functionality of application programs.

Because of the ineffectiveness of help systems, many applications are now employing graphical user interfaces (GUI) to increase usability. Such GUIs often use icons to represent and initiate functions of the application program. While GUIs generally improve the user's ability to use the full functionality of an application program, GUIs are problematic in at least two respects. First, other than the icon for the most common operations such as cut, copy, paste, and open file, it is often difficult for the user to identify the operation that will be performed if an icon button is depressed. Second, there is no consistency in the association of icons to operations between application programs. One application may use a first icon for a copy operation, while a second application uses the same icon for a different operation. Thus, there is a need to provide the user with additional information about the functions offered by an application program.

Therefore, there is a need for a system and methods for providing help information to the user in graphical form. Moreover, there is a need for a system and method increasing the usability of icons and button bars in application programs.

#### Summary of the Invention

The present invention overcomes the limitations and shortcomings of the prior art with a system and methods for automatically presenting instructive graphical images on the display device of a computer. The system of the present invention advantageously comprises: a central processing unit, a display device, an input device, and memory. The memory further comprises an operating system, an application program, a plurality of bit map images, routines for displaying the bit map images based on cursor position, selection or context of operation. The central processing unit, display device, input device, and memory are coupled and operate in a conventional manner to execute the application program stored in the memory. The system also executes the routines to provide on-line and interactive help to the user. The routines are preferably executed concurrently to display graphical help images on the display device. The display of the bit map images is performed automatically by the system of the present invention as utilize the context of operation of the application program, the position of the cursor or the operation being selected as the input to determine the help image, if any, that is displayed.

The present invention also comprises a plurality of methods for automatically displaying graphical images. The methods include: a method for displaying a graphical help image based on the context of operation of the application program, a method for automatically displaying a graphical help  
5 image based selection for modification of parameters; a method for automatically displaying a graphic image based on the position of the cursor; and a method for automatically displaying a help text based on the position of the cursor.

#### Brief Description of the Drawings

10 Figure 1 is a block diagram of a preferred embodiment for the system of the present invention;

Figure 2 is a flowchart of the preferred method for providing advice to the user based on the context of operation of a computer program;

15 Figure 3 is a graphical representation of a screen displaying advice for a line chart in accordance with the present invention;

Figure 4 is a graphical representation of a screen displaying advice for a pie chart in accordance with the present invention;

20 Figures 5A and 5 B are a flow chart of the preferred method for automatically displaying and updating a graphic image identifying the parameters that are being modified;

Figure 6 is a graphical representation of a screen displaying a help image for the cell of a spreadsheet;

Figure 7 is a graphical representation of a screen displaying a help image for heading of a spreadsheet;

25 Figures 8A and 8B are a flow chart of the preferred method for automatically displaying a graphic image or advice based on the position of the cursor;

Figure 9 is a graphical representation of a screen displaying a help image unchanged before movement of the cursor;

30 Figure 10 is a graphical representation of a screen displaying a help image with the grid displayed in a visually distinct manner;

Figure 11 is a graphical representation of a screen displaying a help image with the labels displayed in a visually distinct manner;

35 Figures 12 is a flow chart of the preferred method for automatically displaying text descriptions corresponding to icons based on the position of the cursor;

Figure 13 is a graphical representation of a portion of the screen displaying a help instruction line based on the position of the cursor; and

Figure 14 is a graphical representation of a portion of the screen displaying a help instruction line based on the position of the cursor.

#### Detailed Description of the Preferred Embodiment

Referring now to Figure 1, a block diagram of a preferred embodiment of a system 10 constructed in accordance with the present invention is shown. The system 10 preferably comprises a central processing unit (CPU) 12 that connects with a display device 14, an input device 16, and a program memory 18. The central processing unit (CPU) 12, display device 14, input device 16, and program memory 18 are coupled in a conventional manner such as a personal computer. The central processing unit 12 is preferably a microprocessor such as an Intel 486; the display device 14 is preferably a video monitor; and the input device 16 is preferably a keyboard and mouse type controller. The CPU 12 is also coupled to a printer 32, mass storage 34, and a network 36 in a conventional manner. The system 10 can store data in mass storage 34 or can be accessed through the network 36.

The CPU 12, under the guidance of instructions received from the program memory 18 and from the user through the input device 16, provides signals for the display of data on a screen 15 of the display device 14. The methods of the present invention preferably display graphic help images and help text on the display device 14. These graphic help images and help text make the application program 30 more understandable and easier to use. The graphic images are stored in the program memory 18, and further processed and displayed using other routines 24, 26 in the program memory 18. Those skilled in the art will be aware that various equivalent combinations of devices can achieve the same results when used in accordance with the present invention. For example, while the memory blocks 20, 22, 24, 26, 28, 30 are shown as separate, they can easily comprise different regions of a contiguous space in memory.

The memory 18 preferably stores a plurality of bit map images 20, a plurality of text strings 22, routines 24 for displaying the bit map images or text strings based on the context and selection of operation of an application program, a routine 26 for displaying the bit map images or text strings based on the position of the cursor, an operating system 28 and an application program 30. The present invention preferably uses a conventional operating system 28 such as DOS and Windows sold by Microsoft Corporation. The application program 30 is preferably a graphic presentation package such as Harvard Graphics for Windows. The application program 30 of the present invention provides 13 types of charts that can be created, revised and displayed (See

Appendix A). These chart types include title, bullet, table, pie, horizontal bar, vertical bar, line, area, high/low/close, scatter, organization, drawing and custom templates. The application program 30 also provides several tools or functions for revising and displaying charts. While the memory 18 and methods of the present invention are discussed in this application with reference to a computer program for creating graphic presentation charts and slides (Harvard Graphics For Windows, Version 2.0), those skilled in the art will realize that methods of the present invention may be applied to a variety of different application programs including but not limited to computer drawing programs, word processing programs, and spreadsheet programs.

Since the present invention preferably operates and will be described in the context of a graphics presentation package, the plurality of bit map images 20 are examples of the various types of charts that can be created using the application program. Each bit map is a particular chart type including the appropriate legends, labels or other display characteristics that may be applied to or modified on the chart type. Each of the bit map images preferably has a portion of the image corresponding to a parameter that may be modified using the application program 30 displayed in a visually distinct manner. For example, a pie type chart can have eleven bit map images in the exemplary embodiment of Harvard Graphics. The pie chart can be modified by changing the labels on the pie slices, the legend, or any of the sections forming the pie chart. Each of the eleven bit map images for pie type charts preferably includes two exemplary pies with labels and each pie divided into three slices. Thus, the bit map images for the pie chart include: a first bit map image is two three slice pies with a first slice of the first pie displayed in a visually distinct manner; a second bit map image is two three slice pies with a second slice of the first pie displayed in a visually distinct manner; a third bit map image is two three slice pies with a third slice of the first pie displayed in a visually distinct manner; a fourth bit map image is two three slice pies with all three slices of first pie displayed in a visually distinct manner; a fifth bit map image is two three slice pies with the labels for the slices of the first pie displayed in a visually distinct manner; a sixth bit map image is two three slice pies with a first slice of the second pie displayed in a visually distinct manner; a seventh bit map image is two three slice pies with a second slice of the second pie displayed in a visually distinct manner; a eighth bit map image is two three slice pies with a third slice of the second pie displayed in a visually distinct manner; a ninth bit map image is two three slice pies with all three slices of second pie displayed in a visually distinct manner; a tenth bit map image is

two three slice pies with the labels for the slices of the second pie displayed in a visually distinct manner; and finally, the eleventh bit map image is two three slice pies with all the slices of both the first and second pies displayed in a visually distinct manner. The bit map image of the pie chart is predetermined to have two three-slice pies because this number is sufficient to instruct the user regarding the affects of changing the parameters of the chart. Those skilled in the art will realize that more or fewer bit map images may be provided for additional slices and three slices are provided only by way of example. There will similarly be six bit map images of line type charts including: a first bit map image is a three-line line chart with a first line of the chart displayed in a visually distinct manner; a second bit map image is the same line chart with a second line of the chart displayed in a visually distinct manner; a third bit map image is the same line chart with a third line of the chart displayed in a visually distinct manner; a fourth bit map image is the same chart with all three lines of the chart displayed in a visually distinct manner; a fifth bit map image is the same chart with the legend of the chart displayed in a visually distinct manner; and a sixth bit map image is the same chart with the x-axis labels displayed in a visually distinct manner. Likewise, there are a group of bit map images for each of the 13 chart types. Each of the bit map images highlights a different parameter of the chart type that may be modified. The portion of the chart being highlighted is displayed in a visually distinct manner. The display of a portion of the chart in a visually distinct manner is preferably accomplished by displaying the portion with a color different from the background and the chart such as red. Those skilled in the art will realize that the visually distinct manner can also be achieved by using different fonts, bolding a portion, italicizing a portion, or adjusting the size of a portion to be emphasized.

The memory 18 also stores a plurality of text strings 22 including quick tips, design tips and icon identifiers. For each of the chart types, there are preferably a group of quick tips and design tips. Quick tips are short statements identifying features or commands of the application program 30 that are particularly useful and/or effective for creating and revising the associated type of chart (See Appendix B). Design tips are brief statements that provide advice on the particular type of chart being created to make the chart more effective at presenting the information and make the chart more attractive (See Appendix B). The application program 30 also provides icon buttons for performing the most frequently used application commands similar to other application programs. There are several text strings 22 stored in memory, each string



corresponding to an icon button. There is preferably a text string that identifies each icon by providing information about the command, its function or its operation. Examples of such icon identifying strings include, but are not limited to: open presentation; close current presentation; save presentation; 5 undo last action; redo last action; cut text or objects to clipboard; and paste text or objects from clipboard.

The memory 18 also stores routines 24 for displaying the bit map images or text strings based on the context and selection of operation of an application program, and a routine 26 for displaying the bit map images or text strings 10 based on the position of the cursor. The preferred method advantageously provides four distinct methods that may be operated concurrently. The first method is used to display the quick tips or design tips on the screen 15 of the display device 14 depending on the context in which the user is operating the application program 30. The context is the particular level or window of 15 application program hierarchy that is displayed on the display device 14. More specifically, this first method determines the type of chart being modified and displays the quick tips and design tips on the display device 14. A second method relies on user input to determine which bit map image is displayed on the screen. In particular, the second method monitors the field or parameter 20 that the user has selected to modify and then displays a corresponding graphic image on the display device 14 to provide instructional feedback to the user. The third and fourth methods rely on the position of the mouse cursor to determine the graphical images or text that is displayed on the screen 15. The third method displays an image on the display device 14 corresponding to the 25 position of the mouse cursor. The fourth method displays icon descriptions corresponding to the position of the mouse cursor over particular icons.

Referring now to Figure 2, a flow chart for a preferred method of providing a help image or text based on the context of operation of the application program 30 will be described. In the preferred embodiment, the 30 present invention advantageously improves the usability of an application program 30 by presenting quick tips or design tips to the user 38 on the display device 14. The quick tips and the design tips are tailored to inform the user 38 of features or commands provided by the application program 30 that are very relevant to the particular location or level of the application program 30 in 35 which the user 38 is currently operating. The present invention preferably divides the display area into at least two regions 40, 42. The first region 40 is used to display the standard image provided by the application program 30. In the second region 42 of the display, the design tips or the quick tips are

displayed. The present invention will display either quick tips or design tips in accordance with a selection by the user as to which set of tips should be displayed. While the present invention displays the quick tips and design tips alternately, those skilled in the art will realize that the present invention could  
5 be modified to display both quick tips and design tips simultaneously. The quick tips and design tips may be in the form of text, graphical images or a combination of both.

The preferred method of providing a help image or text based on the context of operation of the application program 30 begins in step 50 with the  
10 selection by the user 38 of a chart for display on the display device 14. Next in step 52, the method determines which chart type is to be displayed. As noted above, the exemplary graphic presentation program provides 13 different types of charts that can be displayed. Each of the 13 different chart types has a unique set of quick tips and design tips that instruct the user how to fully exploit the  
15 capabilities of the program 30. Next, in step 52, the selected chart or chart type is displayed by the application program. Then in step 53, the preferred method determines whether the user wants any quick tips or design tips to be displayed. This is preferably determined by checking the settings for the operation of the application program. The command menus provide a  
20 command which allows the user to selectively activate or deactivate an advisor function. If the advisor function is activated, then the quick tips and design tips will be presented to the user. If the advisor function is not activated, then the display remains unmodified. If it is determined in step 53 that the tips are not to be displayed the method is complete. However, if it is  
25 determined in step 53 that the tips are to be displayed, then the method continues in step 54. In step 54, the method loads the quick tips and design tips corresponding to the chart type into memory. Then in step 55, the size of chart is limited to the first region 40 of the display, and the design tips and quick tips are displayed in the second region 42 of the display. Those skilled in the art  
30 will realize that more quick tips and design tips may be provided at any additional levels of operation of the application program 30. For example, quick tips and design tips may also be presented during creation and revision of charts.

The method for providing help based on the context of application  
35 program operation can be best understood with reference to Figures 3 and 4. Figure 3 is a graphical representation of the screen 15 displaying a window 58 comprising several regions used for interaction between the system, in particular the application program, and the user. As shown in Figure 3, there

is preferably a title region 60 to display the title of the application program in use. The title region 60 extends horizontally across the top of the display and may include a button for exiting the application program, a button for maximizing the window to fit to over the entire screen, and a button for minimizing the size of the window. There is a similar shaped menu region 61 below the title region 60. The menu region 61 lists a plurality of commands that are used to operate the application program. The commands are also used in conjunction with a mouse as is conventional to activate pull down menus. A button bar region 62 is similarly shaped and positioned just below the menu region 61. The button bar region 62 displays a plurality of icons that represent buttons that may be activated to execute program commands in response to user manipulation of the mouse. There are also regions 63, 64, 65 along the left side, bottom and right side of the window 58. The regions provide an area for horizontal and vertical scroll bars as well as additional button to activate other functions and commands of the application program 30. The remaining region 66 of the window 58 forms an area in which the graphic presentation slides or chart and the quick tips are displayed. If the user elects not to display design tips and/or quick tips then the entire region 66 is used to display charts that have been created with the application program. However, if the user elects to display design tips or quick tips then the remaining region 66 is divided into the first and second display regions 40, 42. The first display region 40 is used to display charts that have been created with the application program, just as the entire region was used to display charts. The second display region 42 is used to display design tips or quick tips. The second display region 42 is preferably about 1/3 the size of the first display region 40, and the regions 40, 42 divide the screen 15 horizontally. As shown particularly in Figure 3, the first region 40 displays a line type chart that has been created by the user. The adjacent second display region 42 displays the design tips that can be used to increase the readability and effectiveness of the line type chart. As can be seen, the design tips being displayed include both text comments as well as graphical images illustrating changes that can be made. For example, Figure 3 shows how a particular line may be emphasized by increasing the line thickness using two bit map images of example line charts: one with all lines the same thickness, and another with one line thicker than the rest. When the user is finished reviewing the slide shown in Figure 3, the user may select other slides to view.

Figure 4 illustrates a display device 14 showing the window 58 with a second chart and a different context of operation from the context shown in

Figure 3. Figure 4 illustrates another chart created by the user. The chart of Figure 4 is a pie type chart. The title region 60, the menu region 61, the button bar region 62, the left region 63, the right region 64, bottom region 65 are preferably identical to Figure 3 and retain the same functionality. However, the first display region 40 has been modified to show the pie chart created by the user. The second display region 42 is automatically updated in accordance with the method described above to change design tips to match the type of chart being displayed. As shown in Figure 4, the second display region 42 comprises tips in text form that can be applied to the chart in the first display region 40 to increase its effectiveness at presenting information. The design tips also include graphic images of a sample pie chart illustrating the difference the features of the application program can make. Those skilled in the art will recognize how the second display region 42 may display any of 13 sets of different design tips specially adapted to the chart being displayed.

Figures 5A and 5B illustrate a flowchart for the preferred method for automatically displaying and updating a graphic image identifying the parameters of the chart that are being modified. In addition to monitoring the type of chart being displayed, the present invention also monitors the actions or commands the user is executing. In particular, the present invention provides a data form window 80 for entering the data used to create the chart. The window 80 provides a plurality of fields for entering data including; x-axis labels, series labels, titles, subtitles, footnotes, and other chart data. An example of such a window 80 is shown in Figure 6. The present invention advantageously dedicates a portion of the window 80 for a bit map image of an exemplary chart of the type for which data is being input. A portion of the bit map image corresponding to the field being modified is displayed in a visually distinct manner. The bit map images presented in accordance with the method of the present invention provide the user with feedback as to the effects modification of the selected field will have on the chart.

As illustrated in Figure 5A, the method begins in step 70 by loading bit map images into memory. As noted above, there are preferably a plurality of bit map images for each chart type. Each bit map image highlights a portion of the chart that can be modified. Then in step 71, the locations in memory of the bit map images are stored in an index in memory. This provides the method of the present invention with quick access to the bit map images so they may be displayed as needed. In step 72, the user selects a chart and begins review of the data. As part of the chart selection, the user also selects chart option for the chart type. A plurality of bit map image and index ranges are provided based

on the chart type and the chart option selected. There is a set of images associated with each chart type. The set of image is further divided into subsets. Each option preferably has a different subset of graphic images for the chart type. For example, if the user has selected horizontal bar type chart, there are several different options from which the user must also choose such as a clustered bar chart, a stacked bar chart or a 100% horizontal bar chart. There will be a subset of images for clustered bar charts, another subset of images for stacked bar charts, and an third distinct subset of images for 100% bar charts. The information forming the chart is a preferably displayed to the user in a data form window, as shown in Figure 6. The user may then edit the data forming the chart through manipulation of input device 16. As part of the user's review of the chart data any one of a number of fields may be selected. In step 73, the method preferably determines the range of indexes for the current chart type and chart option being edited. The range of indexes identifies the plurality of bit map images corresponding to the selected chart type and chart option being displayed. For each chart type and chart option, the present invention preferably provides several bit map images, each bit map image highlighting a different parameter of the chart. Then in step 74, the method determines the portion of the chart that has been selected by the user. There are several different parts of each chart that the user may selectively modify. For example, the user may choose to change the x-axis labels, the legend, or the data forming the lines or pie in the chart. Once the field or parameter that the user is modifying has been identified, the method determines the index of the bit map image that displays the same field or parameter corresponding to the field or parameter being modified. Since the present invention provides several bit map images for each chart type, the bit map image highlighting the portion of the chart the user is changing must be identified. For example, for line type charts the plurality of images all includes: a box surrounding three lines, x-axis labels, and a legend. For line type charts the plurality of images preferably includes six bit map images: 1) a first image has a first line displayed in a visually distinct manner; 2) a second image has a second line displayed in a visually distinct manner; 3) a third image has a third line displayed in a visually distinct manner; 4) a fourth image has all three lines displayed in a visually distinct manner; 5) a fifth image displays the legend in a visually distinct manner; and 6) a sixth image displays the x-axis labels in a visually distinct manner. In step 75, the method determines the index for the bit map corresponding to the portion of the chart that the user has selected to modify as determined in step 74. In step 76, the

method tests whether the index of the bit map for the current selected field or parameter is different than the index of the bit map that is currently being displayed. If the index is the same, the display does not need to be updated and the method is complete. However, if the index of the bit map is different from the index of the bit map currently being displayed, the method continues in step 77. In step 77, the bit map located at the location in memory corresponding to the index is retrieved. Then in step 78, the display is updated to display the bit map image retrieved in step 77. Thus, the present invention advantageously displays the bit map image that reflects the effect the user's input will have on the chart being revised or created.

The operation of the method for automatically displaying and updating a graphic image identifying the parameters of the chart that are being modified, is shown in Figures 6 and 7. Figure 6 illustrates a portion of the screen 15 of the display device 14 showing a window 58. The window 58 includes a button bar region 62, a left side region 63, a bottom region 65, and other regions 40, 66 as described above. The application program 30 also displays the data form window 80 partially covering the window 58. The data form window 80 may also include scroll bars, and buttons as in conventional in the art. However, the present invention dedicates an area 82 of the data form window 80 to display a bit map image having a portion displayed in a visually distinct manner. Since the data form corresponds to a line type chart, the bit map image is preferably an image of line type chart comprising a box 86 surrounding three lines 88, 89, x-axis labels 85, and a legend 87. As shown in Figure 6, a bit map image of the exemplary line type chart is displayed in the dedicated area 82. As noted above, line type charts have several parameters that may be modified including the data forming the lines, the x-axis labels, and the legend. In Figure 6, the user is modifying the data of column D, line 1 84 which is data that forms one line of the chart. The user has selected the data in the column D 84 for modification as indicated by the application program's display of column D in a highlighted manner. Once the user has selected the data in column D 84 to modify, the present invention automatically updates the bit map image in the dedicated area 82 to be an image with one line 88 displayed in a visually distinct manner, as shown in Figure 6. As the user modifies other columns such as column B or C, a line type chart with other lines 89 displayed in a visually distinct manner is presented to the user. Referring now to Figure 7, an graphical representation of the same window 80 at a later point in time is shown. At the later point in time, the user has selected the heading for column D to be modified. Once the user has selected a

portion of the form for modification, the method of the present invention automatically updates the dedicated area 82 with an image that reflects the effect of the change on the image. Since the heading for column D is now selected, the bit map image shown in Figure 6 is replaced with the bit map image shown in the dedicated area 82 of Figure 7. The dedicated area 82 of Figure 7 shows a similar bit map image formed of a box 86 surrounding three lines 88, 89, x-axis labels 85, and a legend 87. However, the bit map image in Figure 7, has the legend 87, as opposed to a line 88, displayed in the visually distinct manner such as bolded. Since the heading of column D 83 is selected for modification and any changes to the heading would cause a change in the legend for the chart, the legend 87 of the bit map in the dedicated area 82 is displayed in a visually distinct manner.

Referring now to Figures 8A and 8B, the preferred method for displaying and updating a graphical help image in response to movement of the mouse cursor will be described. The preferred embodiment of the method begins in step 90 by loading the bit map images into memory 18. Then in step 91, the present method stores indexes to the bit map image in memory 18. Next, in step 92, the method defines the positions of areas, in particular selection buttons. If the mouse is positioned in these areas or over these buttons a graphical help image will be updated and displayed. The method also associates each of the areas or buttons with a particular graphical help image that helps describe the effects activating the button will have on the appearance of the chart. Each of the buttons or areas is associated with an image loaded in memory. Then in step 93, the preferred method determines the position of the cursor. Next in step 94, the position of the mouse cursor as determined from step 93 is compared to the position of the selection buttons or areas. Those skilled in the art will recognize that the comparison step may be performed by individually comparing the position of the mouse cursor to each button to determine which button, if any, that the mouse is positioned over. Then in step 95, the process retrieves the index for the bit map for the button over which the cursor is position over. If the mouse is not positioned over any of the buttons, then the preferred method preferably displays a default bit map with no portion of the image highlighted (a generic bit map image), and returns and index to the default bit map. In step 96, the method next determines whether the index of the bit map corresponding to the button over which the cursor is positioned is different from the index of the bit map currently being displayed. If the index to the bit map images is the same, the method leaves the display unchanged and is complete. However, if the index

to the bit map images is different, the method continues in step 97. In step 97, the method retrieves the bit map for the identified index for the button over which the mouse is positioned. Finally, in step 98, the screen 15 of the display device 14 is updated by replacing the existing bit map with a bit map retrieved from memory in step 97.

Referring now to Figures 9, 10, and 11, the different bit map images displayed in accordance with the method of the present invention are shown. Figures 9, 10, and 11, all display a window 100, forming a dialog box that includes an area 102 with buttons 104, 108, 110 for modifying parameters of the chart and a graphical help image 106. Figure 9 illustrates the dialog box for allowing the user to make modifications to a chart. The present method preferably provides a display as shown in Figure 9 before the user has input any changes. As shown, the window 100 includes an area 102 in the lower right hand corner for displaying a graphic help image 106 and providing buttons 104, 108, 110 for user activation for changing parameters of the chart. The display remains the same with the graphic image 106 unchanged until the user positions the mouse cursor 114 over any one of the buttons 104, 108, 110. As the user moves the mouse cursor 114 over the push buttons 104, 108, 110 in the area 102, the graphic image updates to show what kind of options can be changed by activating the button 104, 108, 110 (positioning the mouse cursor 114 over the button and clicking the mouse). As shown in Figure 10, the mouse cursor 114 is positioned over the grid button 108. The methods of the present invention automatically change the graphic image from the bit map 106 of Figure 9 to the bit map image 112 of Figure 10. The bit map image 112 of Figure 10 preferably shows all parameters of the image in gray except the grid lines which are displayed in a visually distinct manner, preferably in red. Since the button over which the mouse cursor is positioned will affect these lines they are shown in the highlighted manner. Similarly, when the mouse cursor 114 is positioned over labels button 110, the graphic image is again updated as shown in Figure 11. Figure 11 shows the window 100 displaying a graphic image 116 that provides the labels displayed in a visually distinct manner, preferably shown in red. As shown, the x-axis labels, the y-axis labels, and the labels above each bar in the bar chart are shown in a highlighted manner distinguishing them from the other features of the chart. With the automatic updating of the graphic image provided by the present invention, the user is able to quickly identify the parameter of the chart that can be modified and what button will allow the user to change these parameters. While this method of the present invention has been described with reference



to vertical bar charts, those skilled in the art will realize that the preferred method be used for pie charts or any other of the chart types.

Referring now to Figure 12, the preferred method for automatically displaying text descriptions corresponding to selection buttons based on the position of the mouse cursor 114 will be described. The present invention advantageously provides additional help based on the position of the mouse cursor 114. The present invention automatically provides the user with descriptions of the functions performed by the selection buttons in the button bar region 62 since it is often impossible to determine the function that will be performed from the icons on the buttons. The method begins in step 120 by loading a text string corresponding to each selection button in memory 18. Then in step 121 the method indexes the text strings stored in memory. In step 122, the position for each of the selection buttons in the button bar region 62 is defined, and each button is associated with a text string load and indexed in memory 18. Next in step 123, the position of the mouse cursor 114 is determined. In step 124, the position of the mouse cursor 114 is compared to the position of the buttons of the button bar region 62. If the mouse cursor 114 is positioned over a button then the index for the text string corresponding to that button is retrieved in step 125. In step 126, the text string corresponding to the button over which the mouse cursor 114 is positioned is retrieved from memory 18. Finally, in step 127, the title bar 61 is updated and the text string is displayed in the title region 60 in place of the title for a predetermined amount of time. In the preferred embodiment, the predetermined amount of time is several seconds. After the predetermined amount of time, the title bar reverts to display the title of the application program 30. Those skilled in the art will realize that alternatively a separate area of the display could be set apart for the purpose of displaying the text string.

The title region 60 usually displays the title of the application 30 as shown in Figures 3 and 4. However, the title region 60 is modified in accordance with the present method as described above and as shown in Figures 13 and 14. Figures 13 and 14 show a portion of the screen 15 of the display device 14 including the title region 60, the menu region 61, the button bar region 62 and part of the remaining region 66. More particularly, figure 13 illustrates the mouse cursor 114 positioned over the undo button 130. The undo button 130 is preferably a button with an inverted "U" shaped icon displayed thereon. The method of the present invention replaces the normal title, "Harvard Graphics," with the text string "Undo last action" in the center of the title region 60. The present invention changes the display in the title

region 60 automatically and the text string "Undo last action" is displayed for the predetermined amount of time and then reverts back to display the string "Harvard Graphics." Similarly, as the mouse cursor 114 is moved over the data form button 132, the title region is updated to display the string "Display Data Form" in place of the title as shown in Figure 14. For each of the buttons in the button bar region 62 the present invention preferably provides a text string to assist the user in effectively using all the commands of the application program 30.

While the present invention has been described with reference to certain preferred embodiments, those skilled in the art will recognize that various modifications may be provided. For example, there may be other embodiments for the methods of displaying the graphic help images in addition to that described above with reference to Figure 5. Similarly, there may be other embodiments for the method for automatically providing help based on the position of the cursor. These and other variations upon and modifications to the preferred embodiment are provided for by the present invention which is limited only by the following claims.

Appendix A

**Examples of Chart Types Available with Harvard Graphics for Windows**

# A Title Chart

## Subtitle of the title chart

Footnote of the title chart

# A Bullet Chart

Subtitle for the bullet chart

- Bullet point 1
- Bullet point 2
- Bullet point 3

Footnote for the bullet chart

Appendix B

Examples of Quick Tips and Design Tips for the Chart Types Available with  
Harvard Graphics for Windows

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## ADVISOR

### Quick Tips

#### Title charts

- To edit, double-click text
- To change font, size, or color, select text then click the right mouse button

#### Bullet charts

- To edit, double-click text
- To change font, size, or color, select text then click the right mouse button
- To add or edit data, double-click the chart

#### Table charts

- To edit, double-click text
- To change font, size, or color, select text then click the right mouse button
- To change chart options, select the chart then click the right mouse button
- To resize a row or column, select the chart, click a heading, then drag a handle
- To add or edit data, double-click the chart

#### Pie charts

- To edit, double-click text
- To change chart options, select the chart then click the right mouse button
- To cut a slice, select the chart, click the slice, then drag the slice
- To change font, size, or color, select text then click the right mouse button
- To add or edit data, double-click the chart

#### Vertical bar charts

- To change chart options, select the chart then click the right mouse button
- To change a bar series, select the chart, click a bar, then click the right mouse button
- To change a bar's color, select the chart, click the bar, click again, then click the right mouse button
- To add or edit data, double-click the chart

#### Horizontal bar charts

- To change chart options, select the chart then click the right mouse button
- To change a bar series, select the chart, click a bar, then click the right mouse button
- To change a bar's color, select the chart, click the bar, click again, then click the right mouse button
- To add or edit data, double-click the chart

#### Line charts

- To edit, double click text
- To change chart options, select the chart then click the right mouse button
- To change a line, select the chart, click a line, then click the right mouse button
- To change line thickness or color, select the legend, click a color, then click the right mouse button
- To add or edit data, double-click the chart

#### Area charts

- To change chart options, select the chart then click the right mouse button
- To change an area, select the chart, click the area, then click the right mouse button
- To change an area's color, select the legend, click a color, then click the right mouse button
- To add or edit data, double-click the chart

#### High/Low/Close charts

- To edit, double-click text
- To change chart options, select the chart then click the right mouse button
- To change grid lines, select the chart, click a grid line, then click the right mouse button
- To add or edit data, double-click the chart

#### Scatter charts

- To edit, double-click text
- To change chart options, select the chart then click the right mouse button
- To change the color of a series of points, select the chart, click a point in the series, then click the right mouse button
- To add or edit data, double-click the chart

#### Organization charts

- To edit, double-click text
- To change chart options, select the chart then click the right mouse button
- To change the font, size, or color of a text block, select the chart, click the text, click again, then click the right mouse button
- To add or edit data, double-click the chart

#### Drawing charts

- To edit, double-click text
- To change color, select an object then click the right mouse button

#### Custom charts

- To edit, double-click text



#### Horizontal bar charts

- Use a horizontal bar chart to make comparisons that don't involve time
- Show six or fewer series of bars (the fewer, the better)
- Show the chart's data table when details are necessary
- Use a vertical bar chart to compare sets of data that change over time
- Show data labels to the right of each bar for clarity

#### Line charts

- Use a line chart to show trends in data over time
- Show six or fewer lines (the fewer, the better)
- Show estimates and projections as dashed or dotted lines
- Make the most important line the thickest

#### Area charts

- Use an area chart to show changes in quantity, volume or totals
- Show six or fewer areas (the fewer, the better)
- Put the series with the lowest values first (front) in an overlap area chart
- Use a stacked area chart to show cumulative totals
- Use a line chart to show trends in data over time

#### High/Low/Close charts

- Use a high/low/close chart to track changes in data during a fixed time period
- Track stocks, bonds, and other securities
- Add a line series (use the Y2 axis) to track trading volume
- Use the area option to show the range of data

#### Scatter charts

- Use a scatter chart to show the correlation between two series of data (one series must be the X-axis data).
- Plot XY data
- Use a line fit (choose Series from the Chart menu) to show the correlation between the X-axis data and a series

#### Organization charts

- Use an organization chart to show structure or hierarchy
- Show five or fewer levels
- Limit the number of boxes at each level to improve clarity and readability
- Use a vertical orientation for the bottom row to show many names or words

- To change chart options, select the chart then click the right mouse button
- To add or edit data, double-click the chart

## Design Tips

### Title charts

- Use a title chart to introduce a presentation or a new topic in a large presentation
- Use few words
- Leave lots of blank space
- Avoid ALL CAPS (its harder to read)

### Bullet charts

- Use a bullet chart to list topics, steps, or conclusions
- Use six or fewer topics per list
- Use 6-8 words per topic
- Write brief topics of similar length, style, and tone
- Limit the number of fonts and colors
- Avoid ALL CAPS (its harder to read)

### Table charts

- Use a table chart to make detailed comparisons of text or numbers
- Limit the number of rows and columns to avoid crowding
- Keep headings brief and specific
- Put common information (\$, %, units) in headings instead of rows and columns
- Highlight text or numbers to emphasize significant data

### Pie charts

- Use a pie chart to compare the parts of a whole (percentages)
- Cut a slice away from the pie to emphasize it
- Display percentages as labels for each slice
- Show six or fewer slices (combine smaller slices into one and show as a column chart)

### Vertical bar charts

- Use a vertical bar chart to compare sets of data that change over time
- Show six or fewer series of bars (the fewer, the better)
- Show the chart's data table when details are necessary
- Use a horizontal bar chart to make comparisons that don't involve time
- Show data labels above each bar for clarity
- Avoid grid lines in 3-D bar charts

### Drawing charts

- Use a blank slide to create conceptual information using the drawing tools, clip art, symbols, and bitmaps

- Use symbols sparingly
- Keep drawings simple to improve clarity and readability

Custom charts

- For customized slides that you make frequently, create a template that has your preferred chart options
- Tie together multi-chart slides by having a common idea reinforced in each chart

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WHAT IS CLAIMED IS:

1. A system for displaying graphical help images in response to user input, the system comprising:
  - a display device for displaying information to the user, the display device having and input;
  - an input device for inputting information to the system, the input device having an output;
  - a memory for storing a plurality of graphic images and routines, the memory having inputs and outputs, the memory including an application program, an array of graphic images, a routine for displaying the graphic image in response to the user movement of the input device, and a routine for displaying the graphic image in response to a context of operation of the application program; and
  - a processing unit for receiving signals from the input device and memory, for sending signals to the output device and memory, the processing unit having inputs and outputs, the inputs coupled to the output of the input device and the outputs of memory, the outputs coupled to the inputs of memory and the display device.
2. The system of claim 1, wherein the application program is a presentation graphics program and the graphic images are bit map images of chart types.
3. The system of claim 1, wherein each graphic image displays a different feature in a visually distinct manner.
4. A computer implemented method for displaying graphical help images in response to a context of operation of an application program on a computer system, the method comprising the steps of:
  - determining the context of operation of the application program;
  - loading a plurality of graphical help images into memory, each of the graphical help images corresponding to a context of operation of the application program;
  - determining the graphic image corresponding to the context in which the application program is being operated; and
  - displaying the graphic image determined to correspond to the context of operation of the application program.
5. The method of claim 4, wherein the application program is a presentation graphics program for creating and revising a plurality of chart types, and wherein the step of determining the context of operation of the application program further comprises the steps of:

accepting the user input selecting a chart type for display; and  
determining the type of chart the user has selected for display.

6. The method of claim 4, wherein the method determines whether the user want the graphic image displayed before the steps of loading, determining and displaying, and eliminates these steps if the user does not want the graphic images displayed.

7. The method of claim 4, wherein the graphic image comprises design tips and quick tips.

8. A computer implemented method for automatically displaying graphical help images in response to user selection of a parameter or command in an application program on a computer system, the method comprising the steps of:

storing a plurality of images in memory, each image corresponding to a parameter of the application program that may be selected;

determining the parameter the user has selected to modify;

determining the image corresponding to the parameter that the user has selected to modify;

retrieving from memory, the image corresponding to the parameter the user has selected to modify; and

updating a display of the computer system with image retrieved from memory.

9. The method of claim 8, wherein the images stored in memory are bit map images, and an index to locations of the bit map images in memory is also stored in memory.

10. The method of claim 9, wherein the application is a graphic presentation program, and wherein the method further comprises the step of determining the range of indexes for the current parameter selected.

11. The method of claim 8, wherein the application is a graphic presentation program for creating charts, and the step of determining the parameter the user has selected to modify includes determining the portion of the chart being displayed that the user has selected to modify.

12. The method of claim 9, wherein the application is a graphic presentation program for creating charts, and the step of determining the image corresponding to the parameter the user has selected to modify further comprises the steps of:

identifying an index for the parameter the user has selected to modify;

and

locating in memory a bit map image at the position of the index.

13. The method of claim 12, wherein the step of retrieving from memory comprises the step of retrieving the bit map image located in memory at the position identified by the index.

14. The method of claim 13, further comprising the steps of:  
determining the index of the bit map image being displayed;  
comparing the index of the bit map image being displayed to the index of the bit map image corresponding to the parameter the user has selected to modify; and

performing the steps of retrieving the image from memory and updating the display only if the index of the bit map image being displayed is different from the index of the bit map image corresponding to the parameter the user has selected to modify.

15. A computer implemented method for automatically displaying graphical help images in response to movement of a cursor displayed on a display device of a computer system, the method comprising the steps of:

storing a plurality of graphic images in a memory of the computer system;

defining an area on the display device for a graphical button;  
associating the button with a graphic image stored in memory;  
determining the position on the display device of the mouse cursor;  
comparing the position of the mouse cursor to the area for the button;  
retrieving the graphic image if the position of the mouse cursor is within the area for the button; and  
updating the display with the retrieved graphic image if the position of the mouse cursor is within the area for the button.

16. The method of claim 15, further comprising the step of:  
defining a plurality of areas on the display device, each of the areas corresponding to a different button;

wherein the step of comparing the position of the mouse cursor includes a comparison of the position of the mouse cursor to each of the plurality of areas; and

wherein the steps of retrieving and updating are performed for each button if the mouse cursor is within the area for the respective button.

17. The method of claim 15, wherein the plurality of images are bit map images.

18. The method of claim 17 further comprising the steps of:  
indexing the plurality of graphic images stored memory; and  
storing the index in memory.

19. The method of claim 18, further comprising the steps of:  
retrieving the index of the bit map for the button over which the cursor is positioned;

determining the index of the bit map image currently displayed;  
comparing the index of the bit map image currently displayed to the index retrieved; and

performing the steps of retrieving the graphic image and updating the display only if the index of the bit map image currently displayed is different from the index retrieved.

20. The method of claim 15, wherein the computer system includes an application program for creating graphic presentation charts, and the plurality of image include images of different chart types with a portion of each image displaying a parameter corresponding to the button in a visually distinct manner.

21. The method of claim 21, wherein the visually distinct manner is display of the portion in a different color from the remaining parts of the image.

22. A computer implemented method for automatically displaying text help strings in response to movement of a mouse cursor displayed on a display device of a computer system, the method comprising the steps of:

storing a plurality of text strings in a memory of the computer system;  
defining an area on the display device for a graphical button;  
associating the button with a text string stored in memory;  
determining the position on the display device of the mouse cursor;  
comparing the position of the mouse cursor to the area for the button;  
retrieving the text string if the position of the mouse cursor is within the area for the button; and

updating the display with the retrieved text string if the position of the mouse cursor is within the area for the button.

23. The method of claim 22, further comprising the step of:  
defining a plurality of areas on the display device, each of the areas corresponding to a different button; and

wherein each of the text strings stored in memory correspond to one of the plurality of buttons;

wherein the step of comparing the position of the mouse cursor includes a comparison of the position of the mouse cursor to each of the plurality of areas; and

wherein the steps of retrieving and updating are performed for each button if the mouse cursor is within the area for the respective button.

24. The method of claim 23 further comprising the steps of:  
indexing the plurality of text strings stored memory; and  
storing the index in memory.

25. The method of claim 24, further comprising the steps of:  
retrieving the index of the text string for the button over which the cursor is positioned;  
determining the index of the text string currently displayed;  
comparing the index of the text string currently displayed to the index retrieved; and

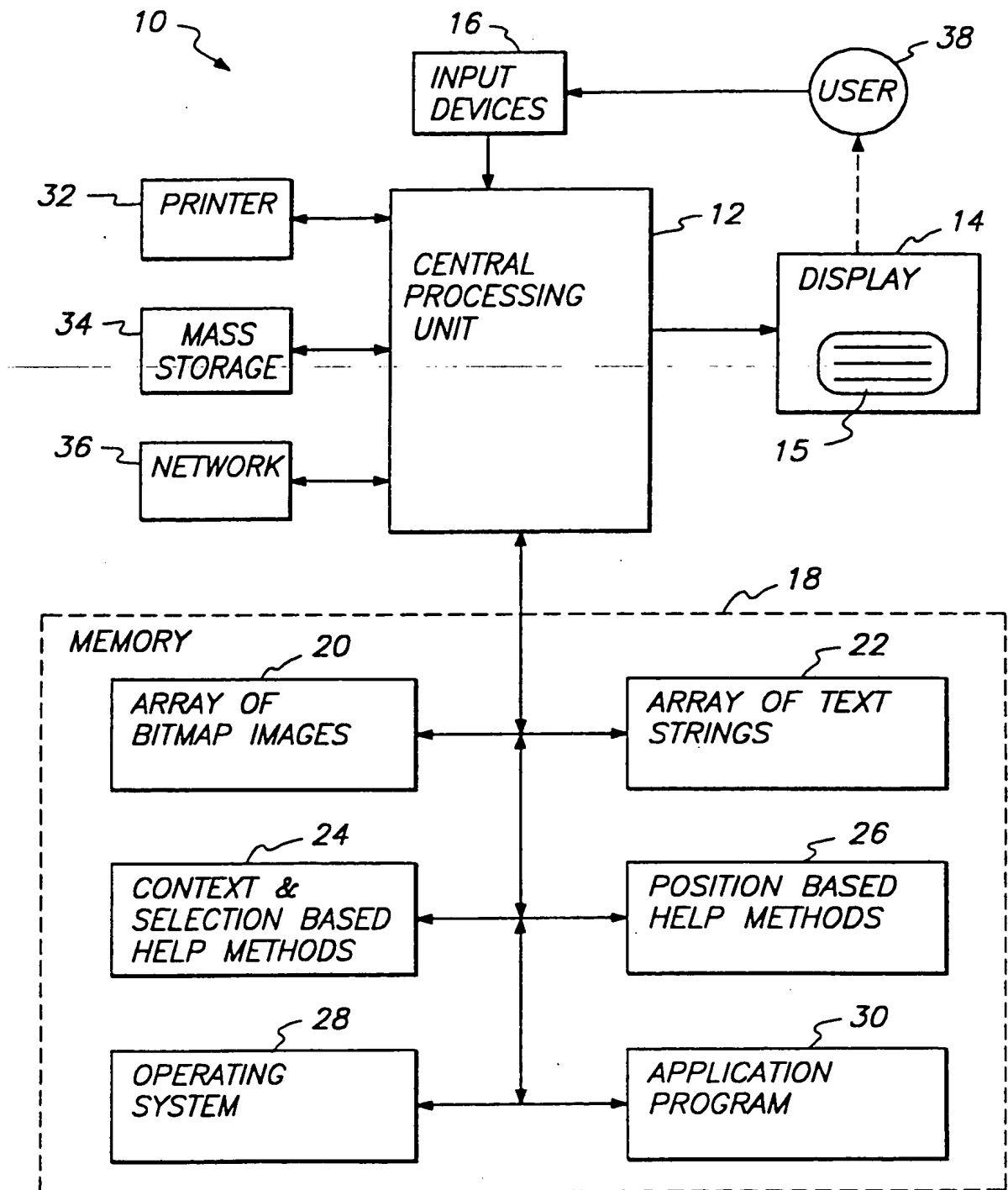
performing the steps of retrieving the text string and updating the display only if the index of the text string currently displayed is different from the index retrieved.

26. The method of claim 23, wherein the step of updating the display is performed such that the text string is displayed for a predetermined amount of time.

27. The method of claim 26, wherein the predetermined amount of time is about 5 seconds.

28. The method of claim 26, wherein the portion of the display that is updated is the title bar.



**FIG. 1**

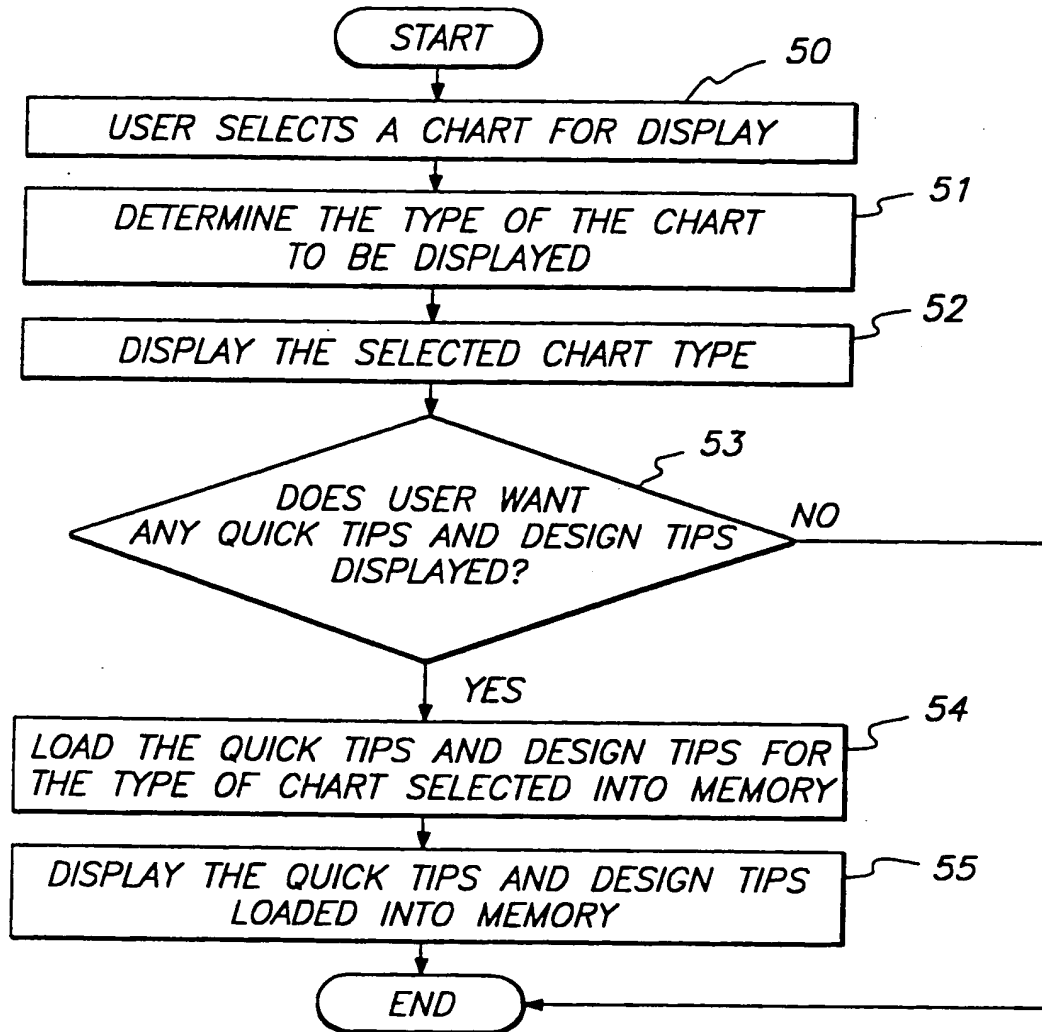


FIG. 2

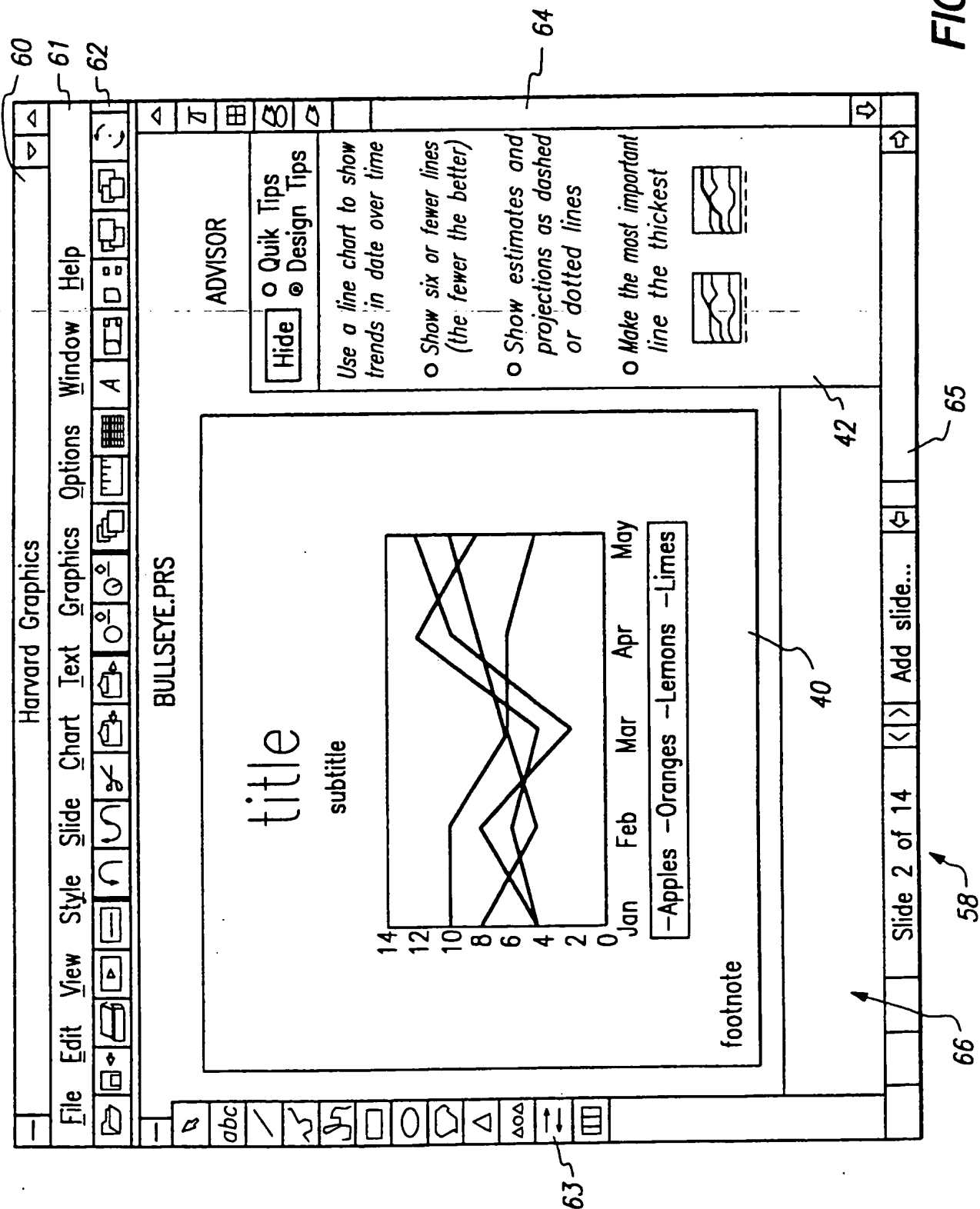


FIG. 3

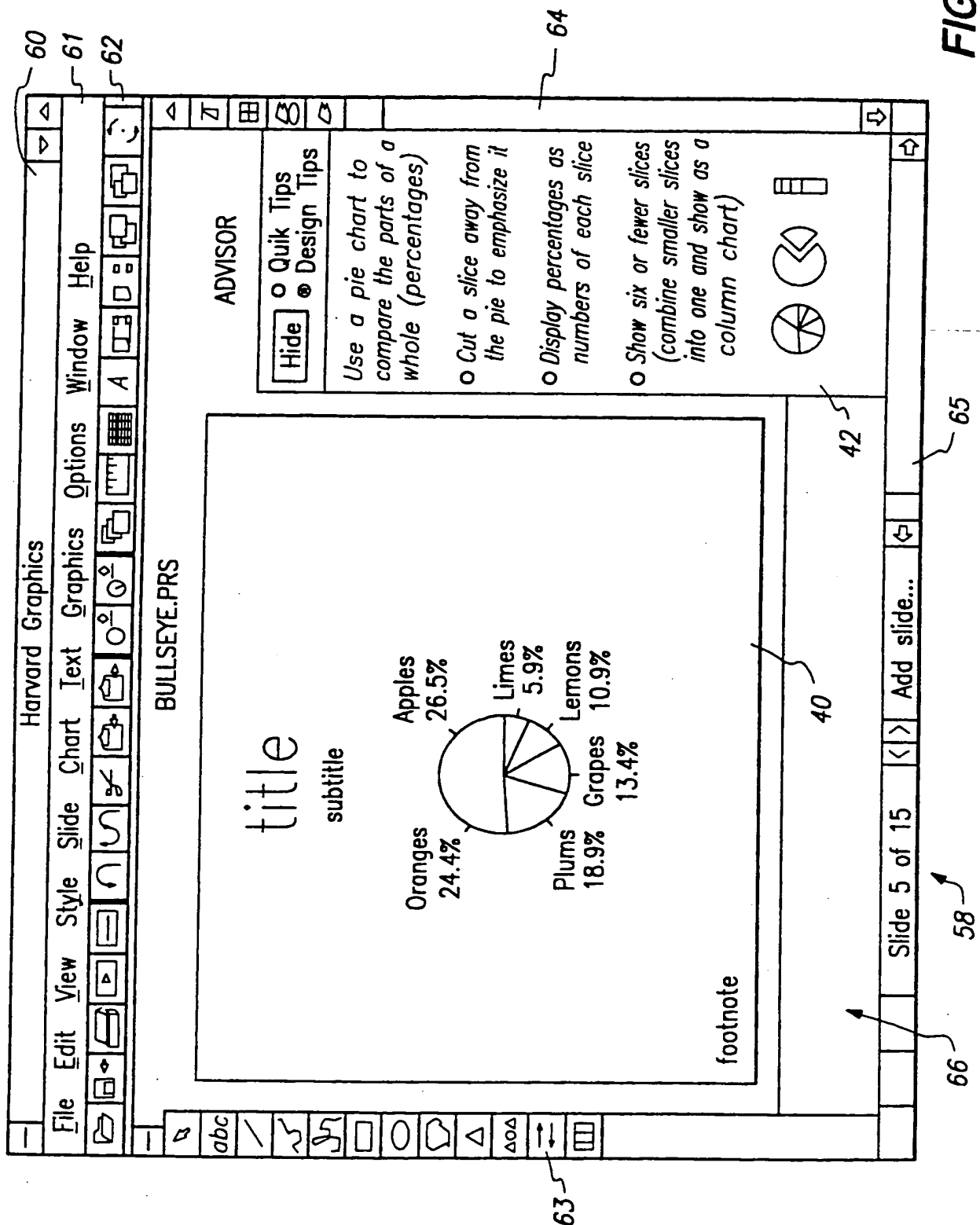
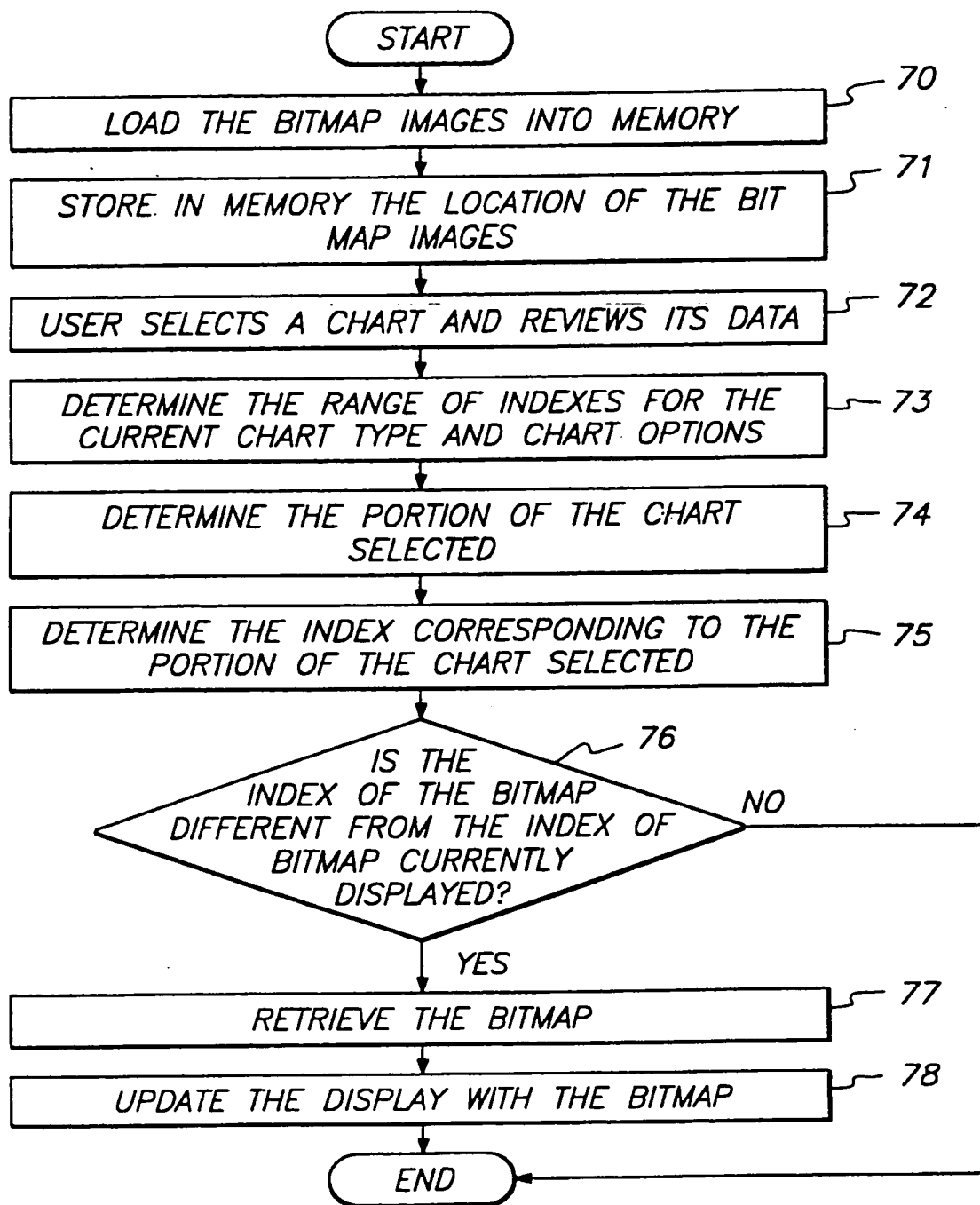


FIG. 4



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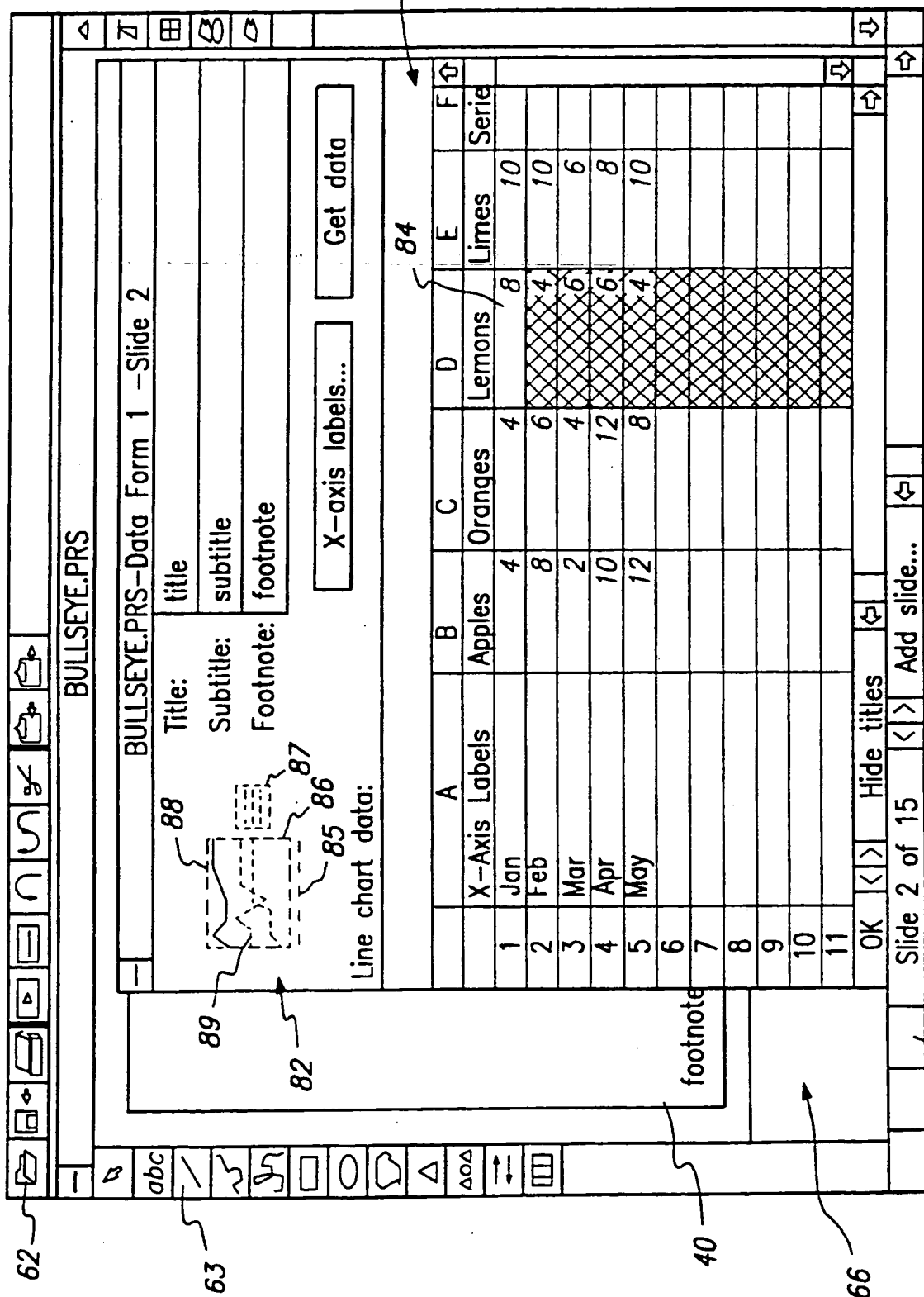


FIG. 6

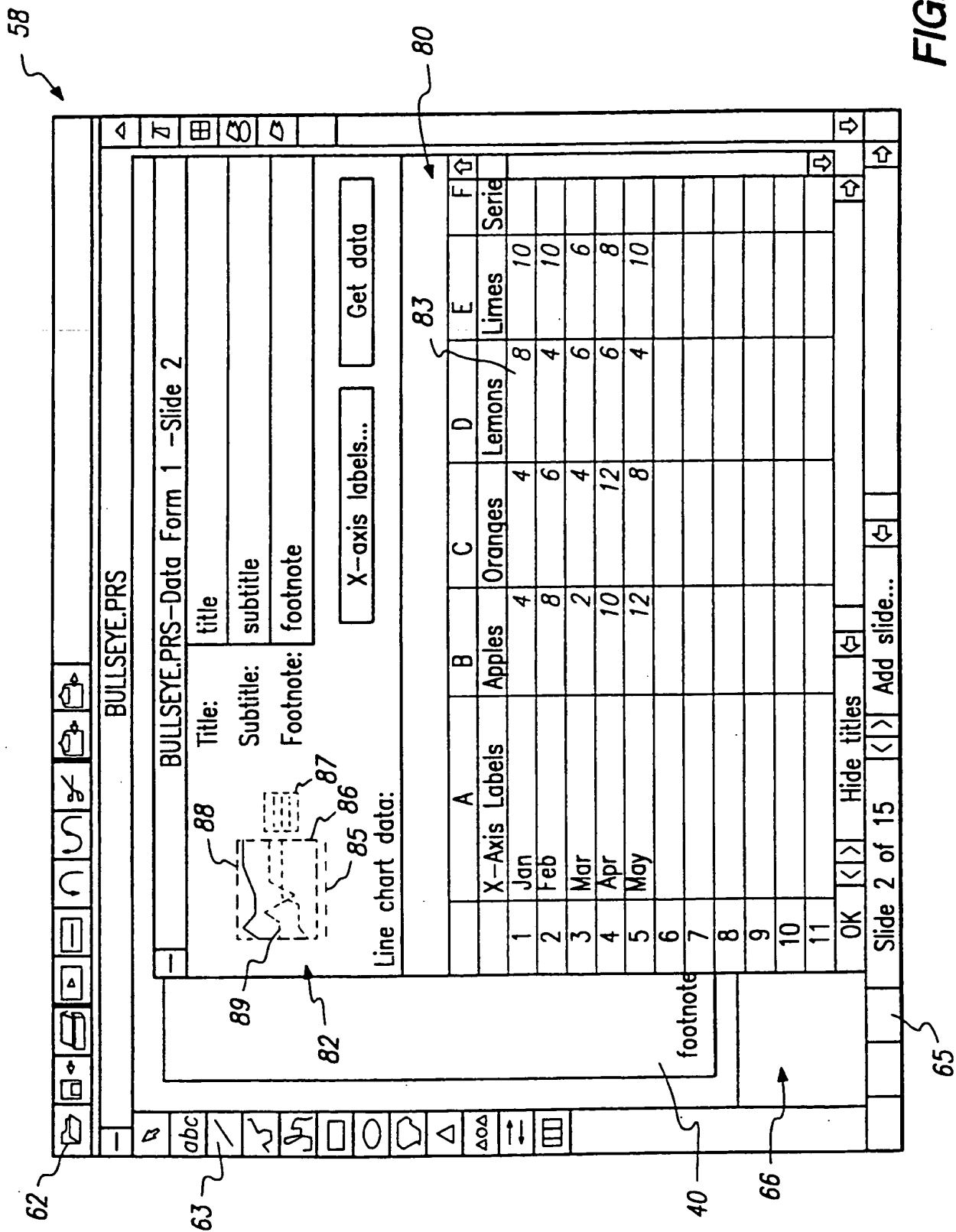
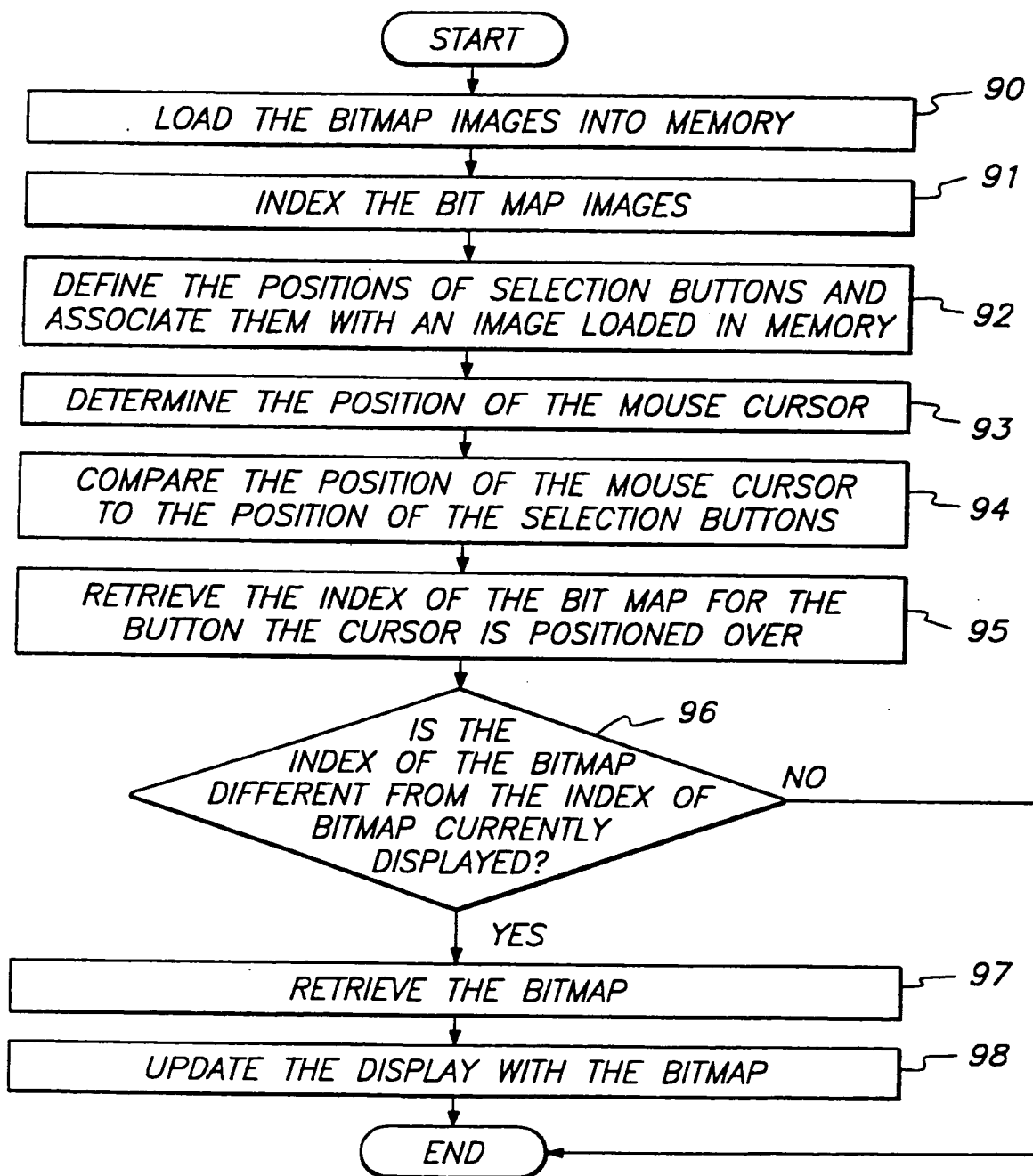


FIG. 7





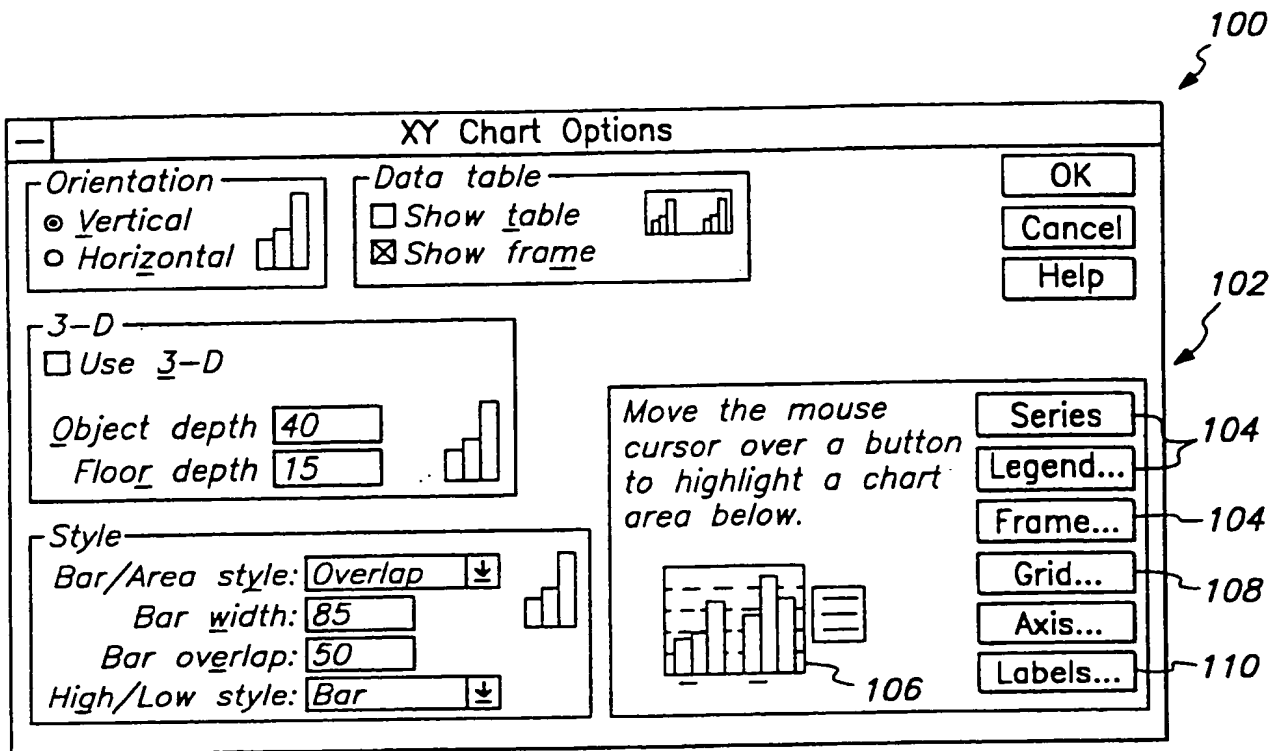


FIG. 9

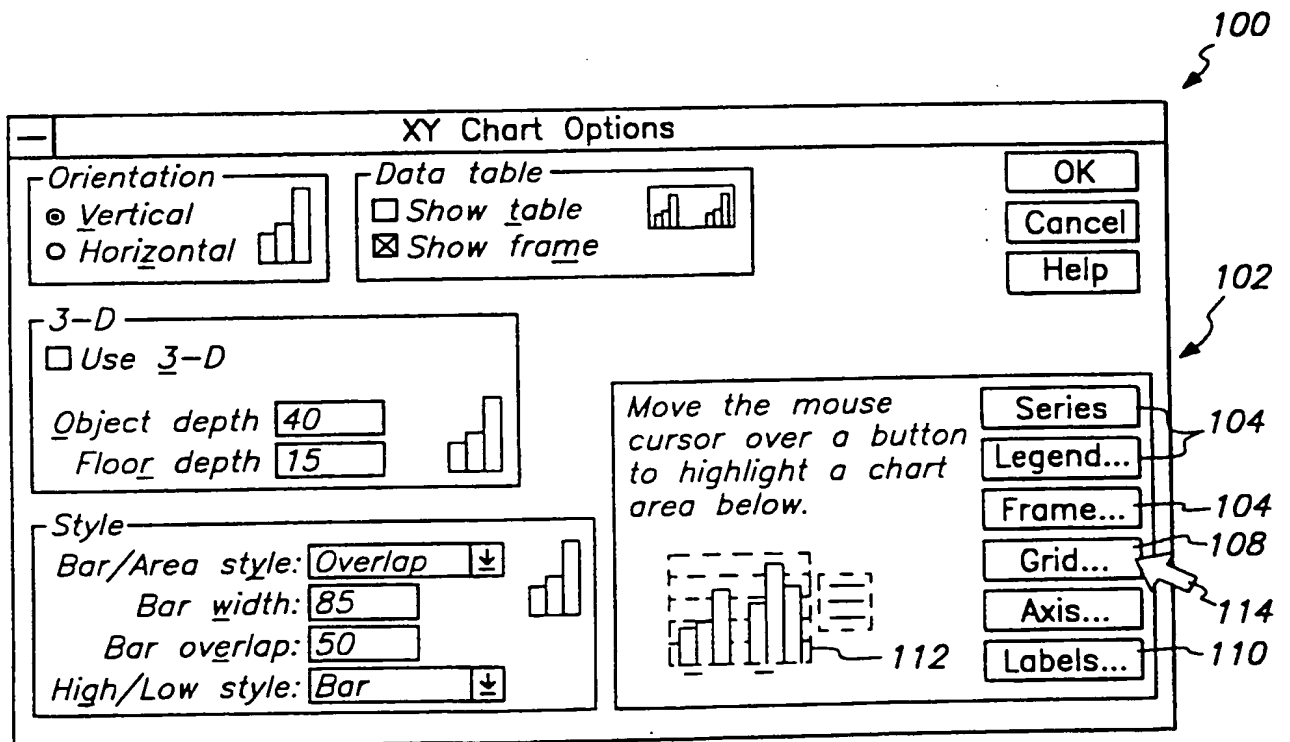


FIG. 10

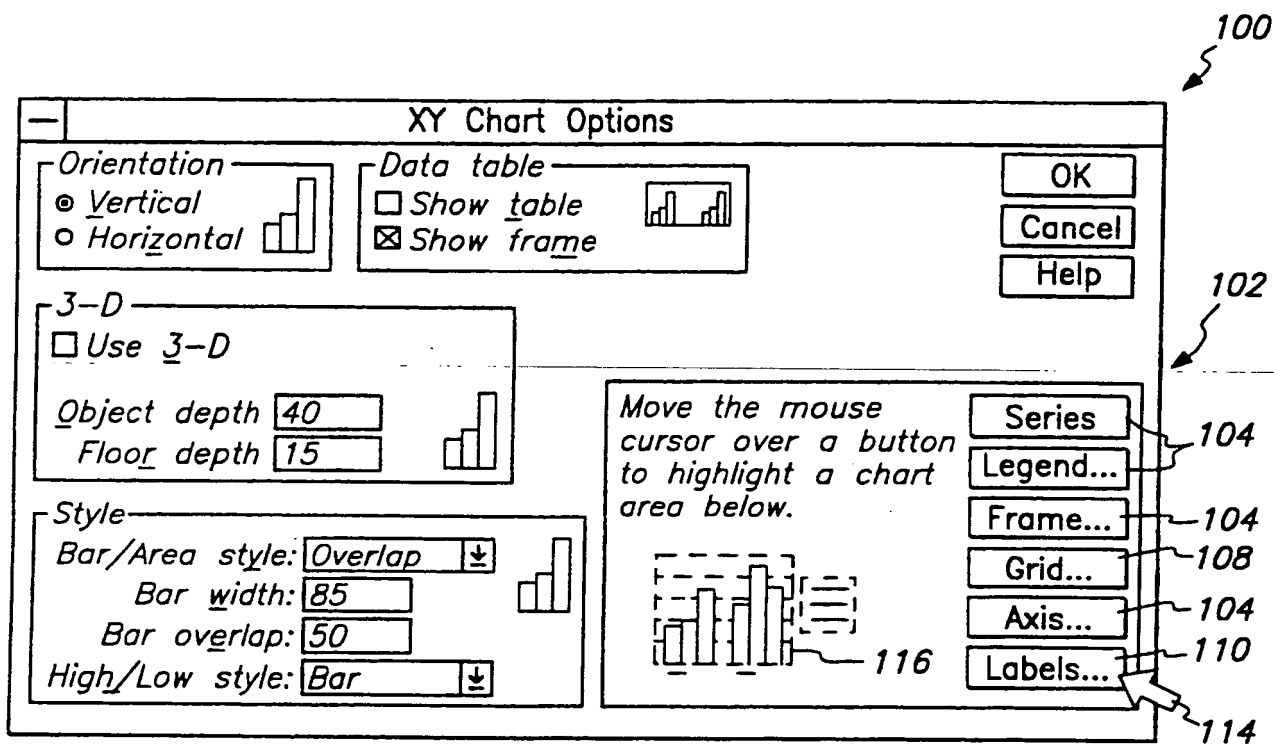
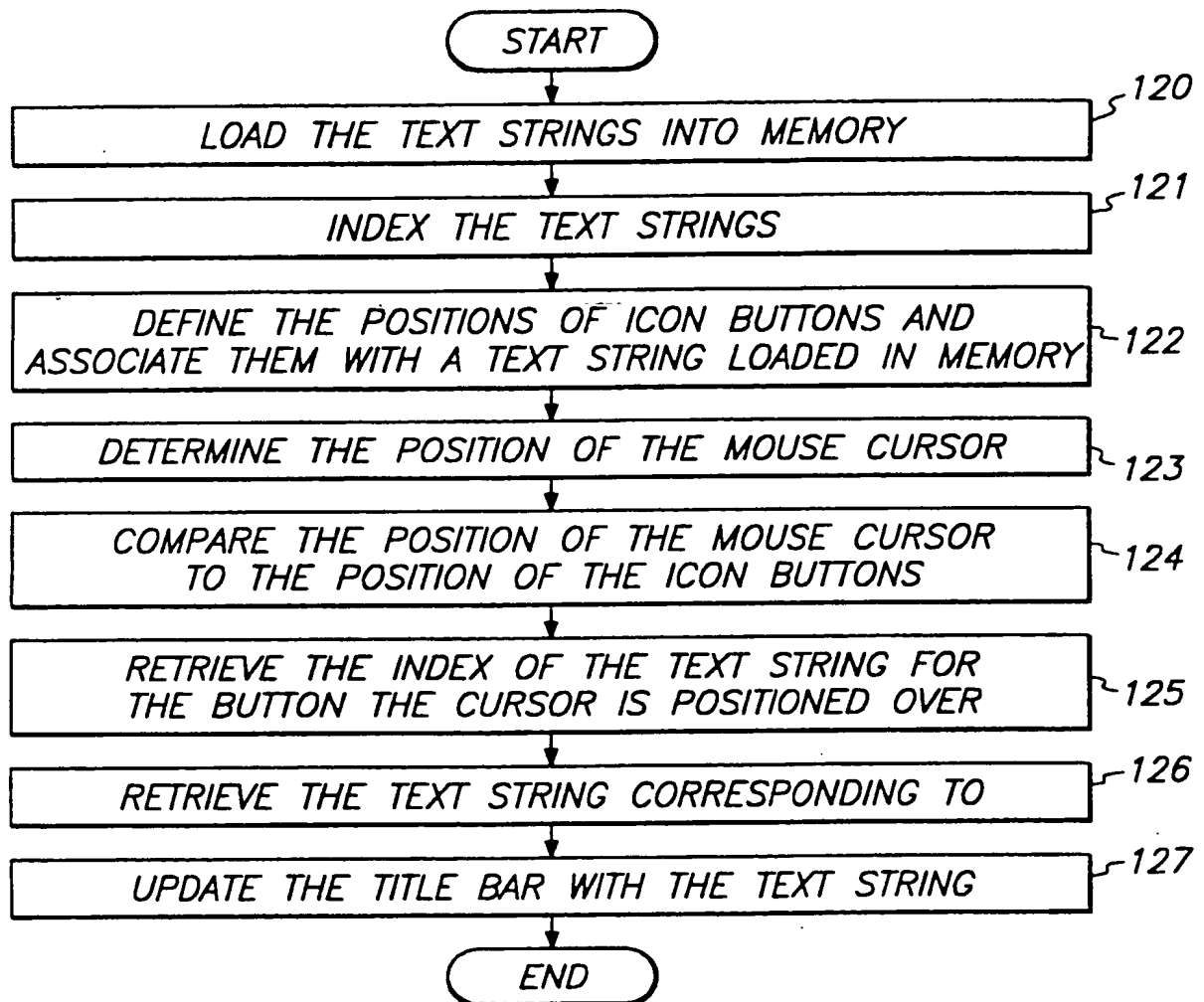
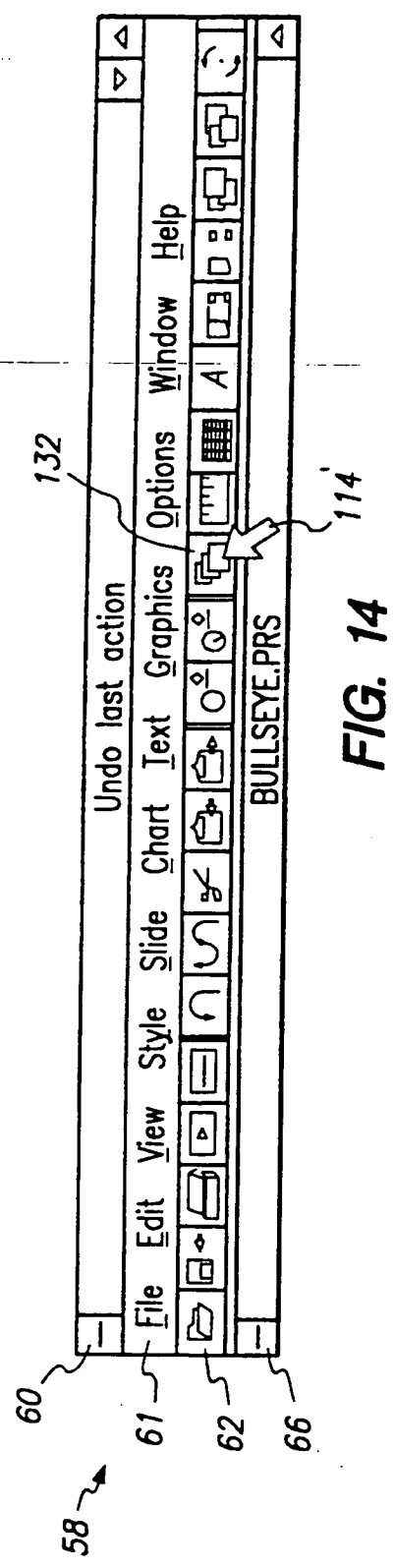
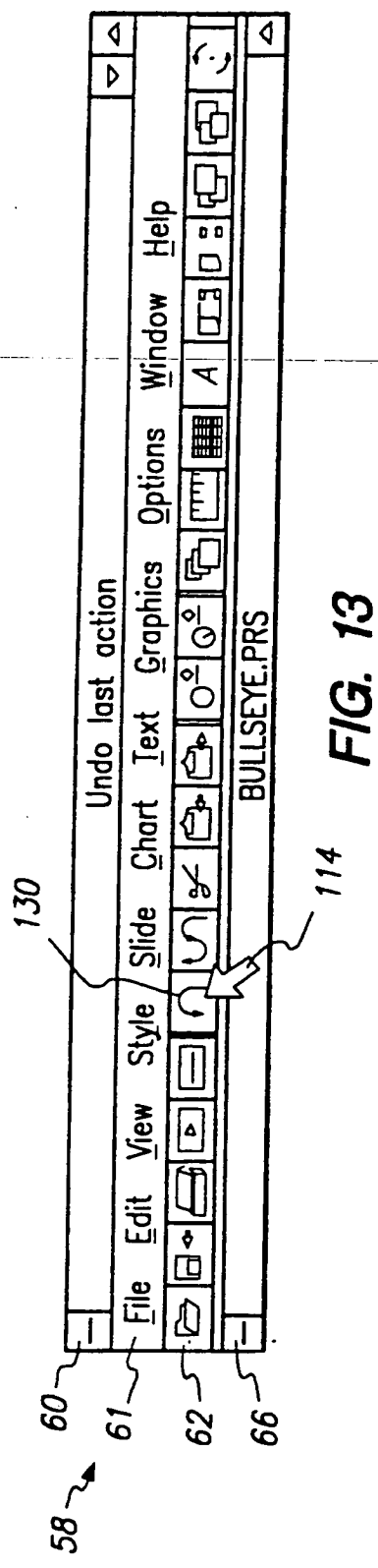


FIG. 11

**FIG. 12**



# A Table Chart

Subtitle of the table chart

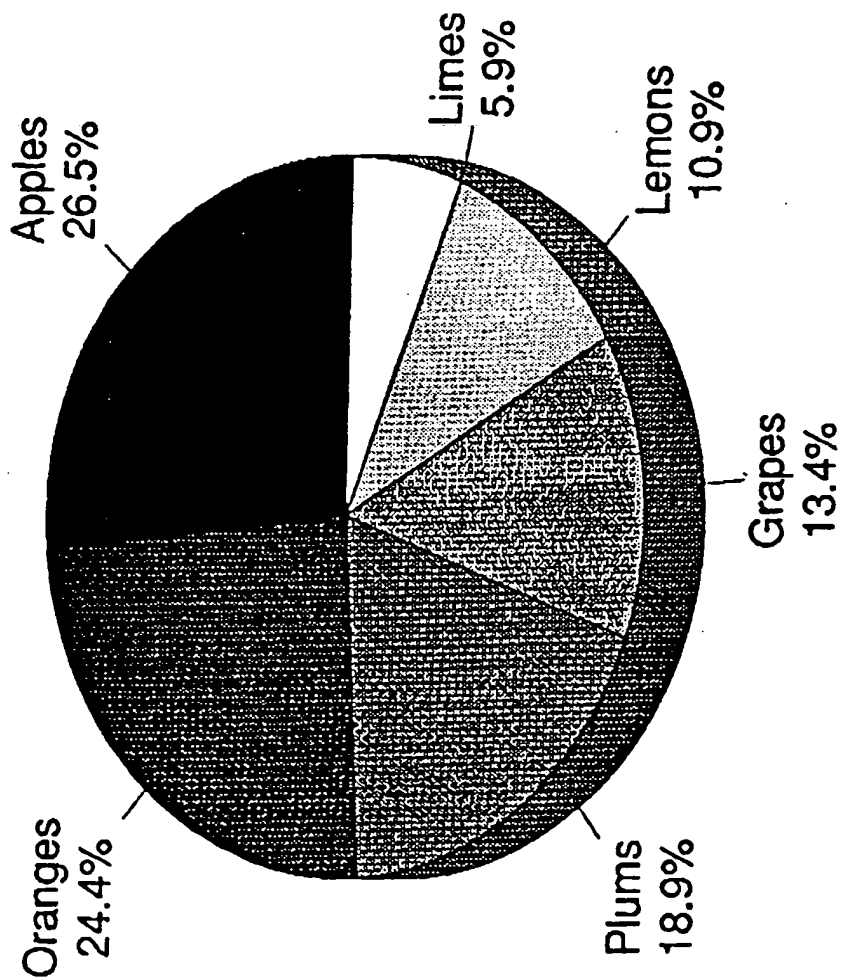
Column 1	Column 2	Column 3
3	Red	United States
6	Yellow	Canada
4	Green	Mexico
9	Blue	Honduras

Footnote for the table chart

FIG. 15

# A Pie Chart

Subtitle for the pie chart



Footnote for the pie chart

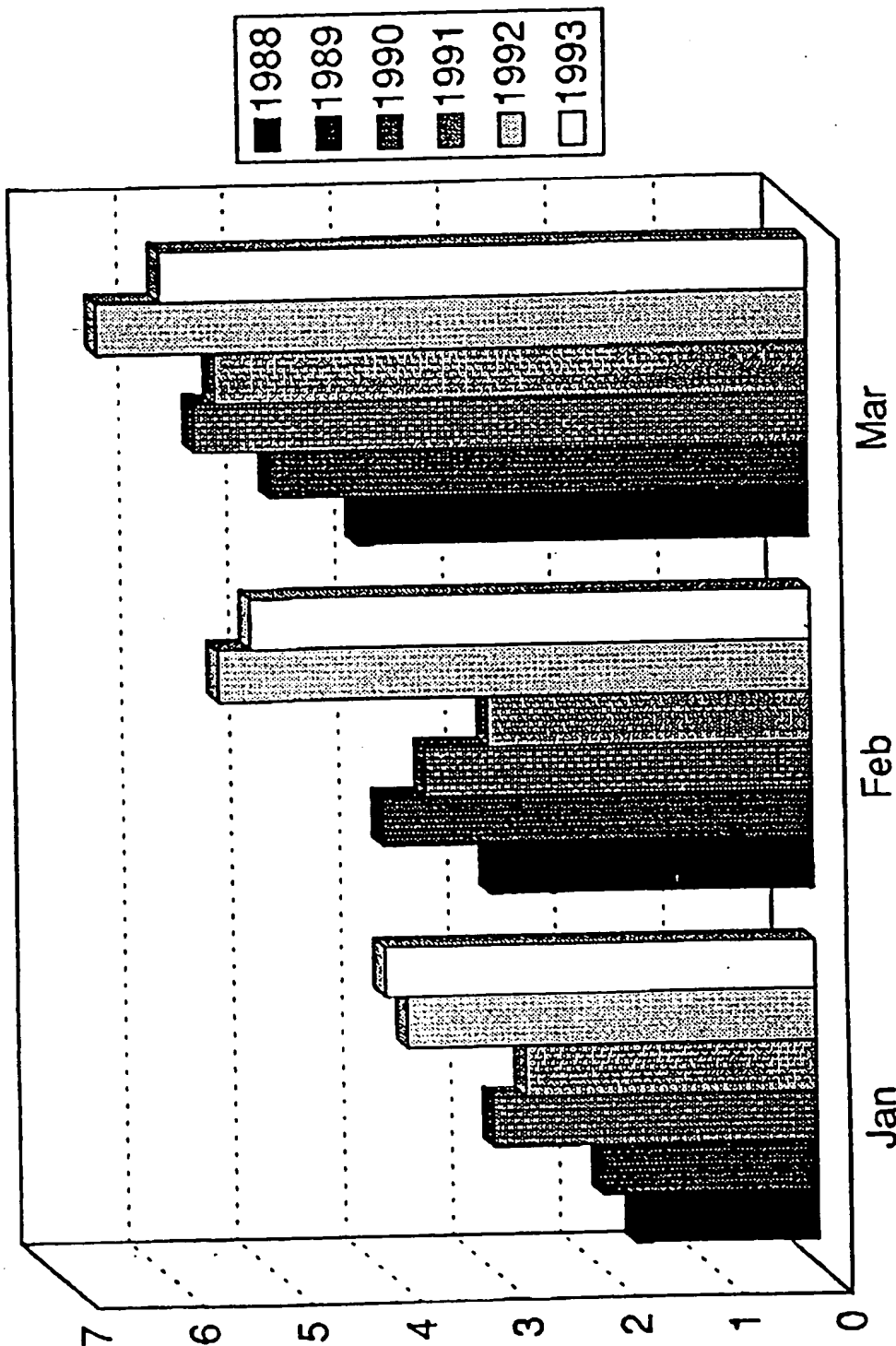
FIG. 16

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# A Vertical Bar Chart

Subtitle for the vertical bar chart

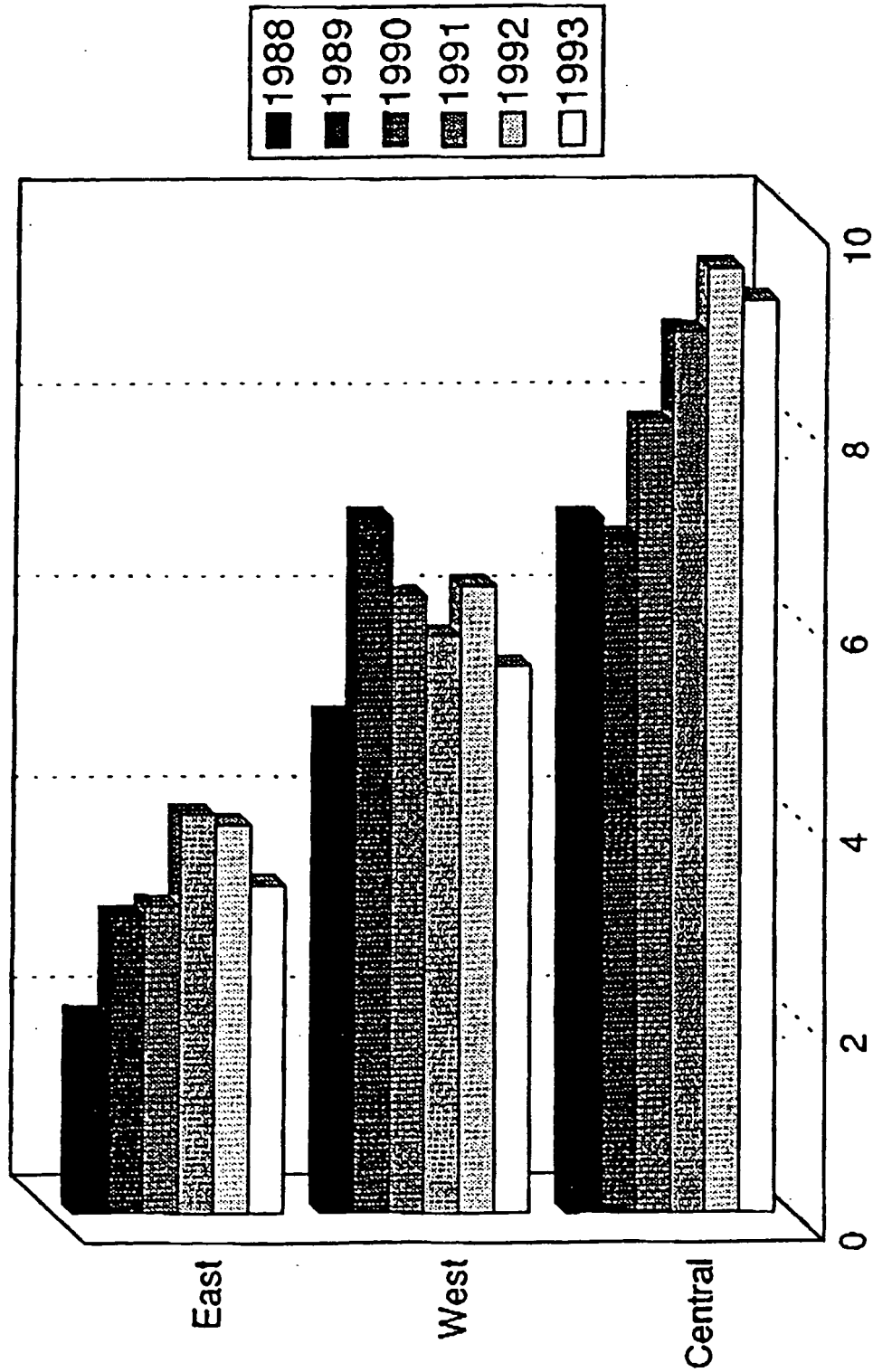


Footnote for the vertical bar chart

FIG. 17

# A Horizontal Bar Chart

Subtitle for the horizontal bar chart



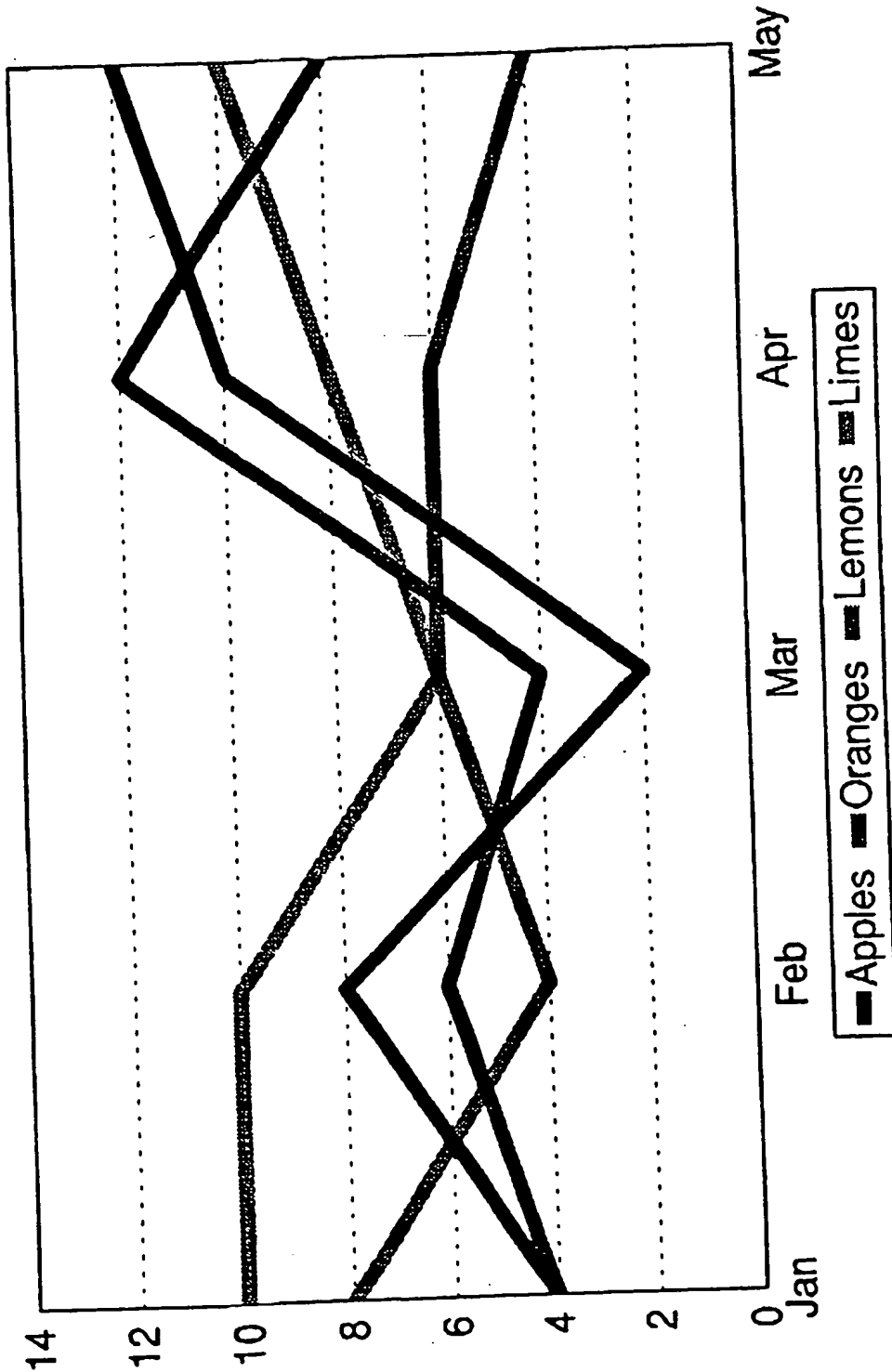
Footnote for the horizontal bar chart

FIG. 18



# A Line Chart

Subtitle for the line chart

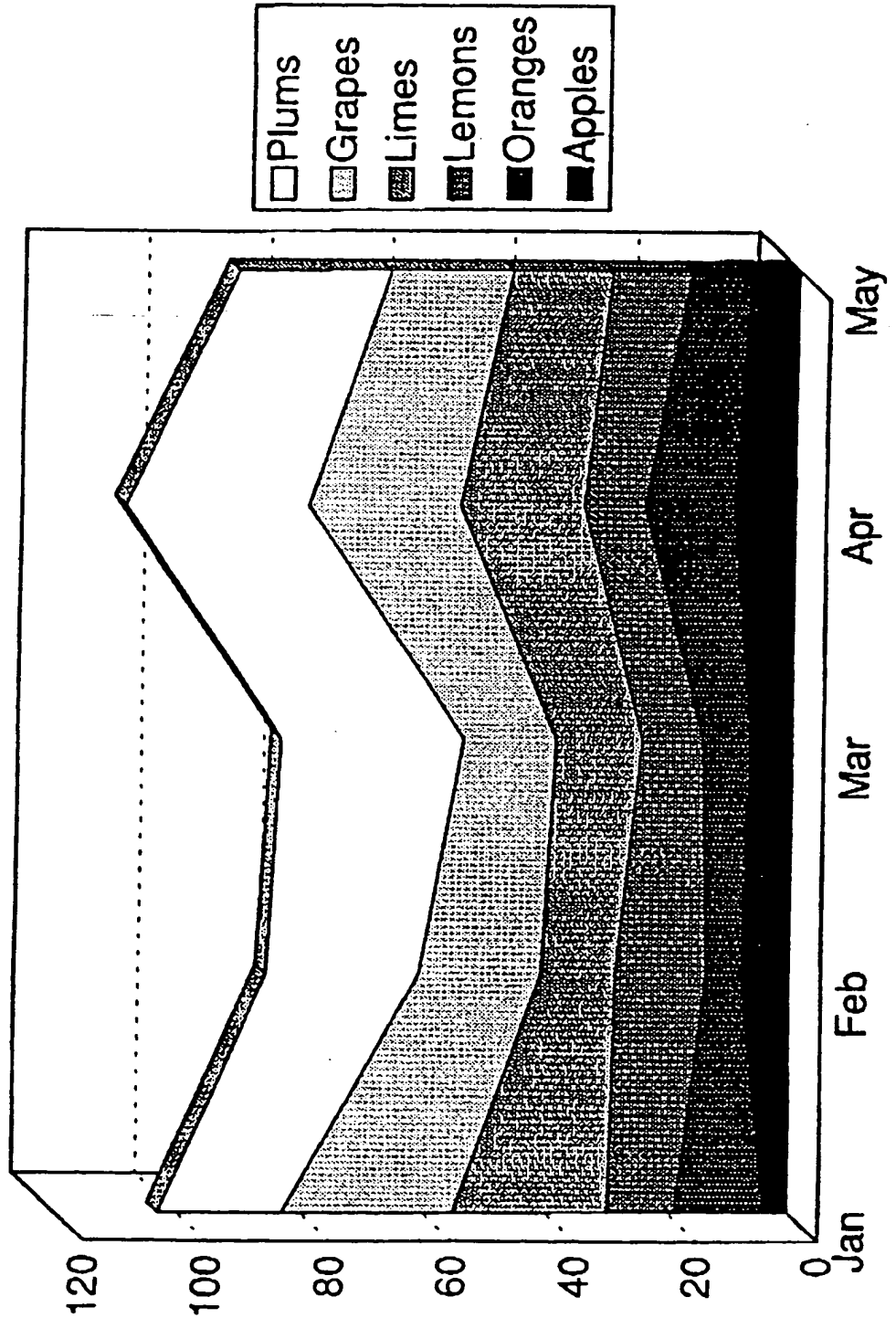


Footnote for the line chart

FIG. 19

# An Area Chart

Subtitle for the area chart

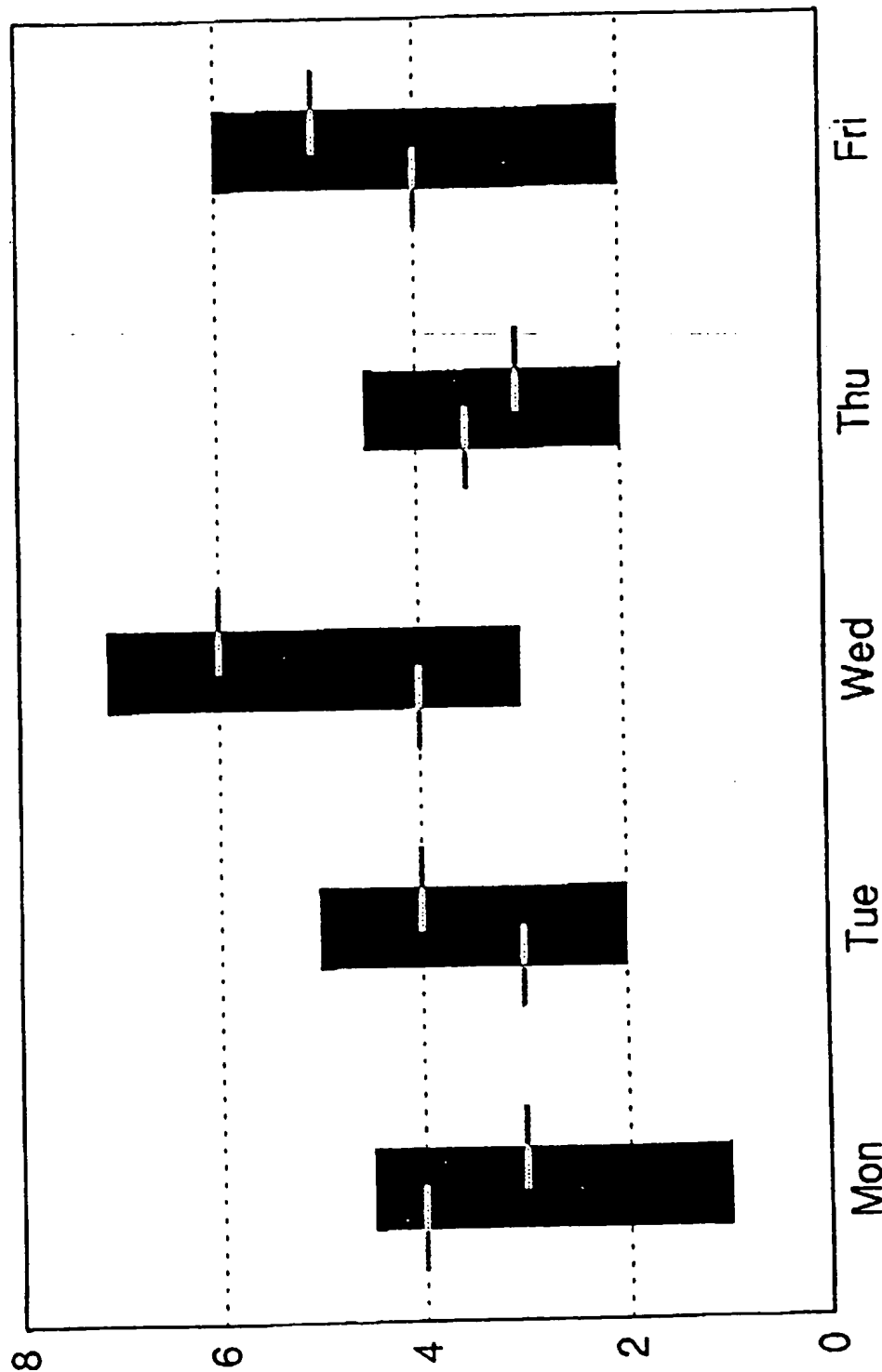


Footnote for the area chart

FIG. 20

# A High/Low/Close Chart

Subtitle for the high/low/close chart

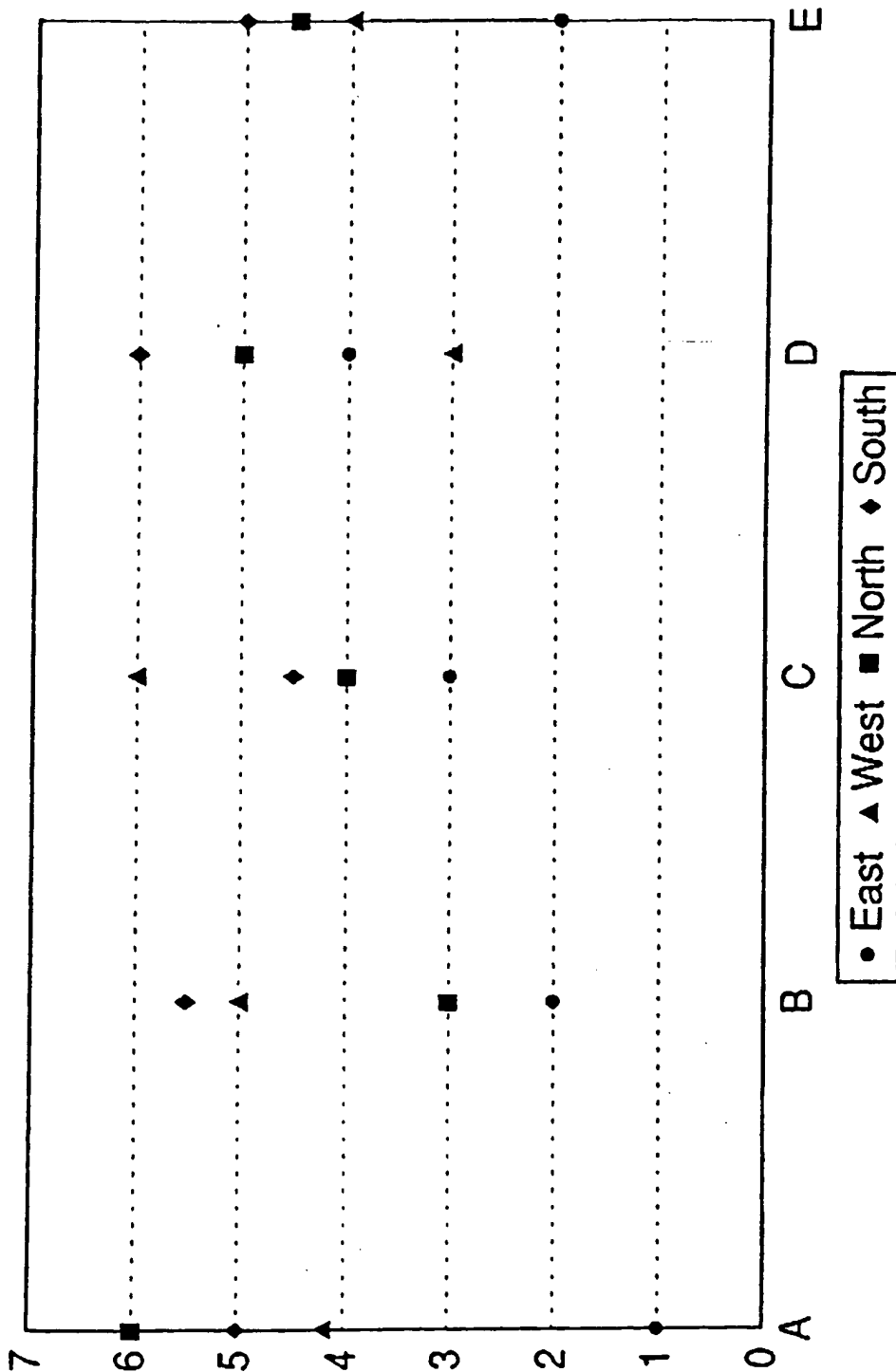


Footnote for the high/low/close chart

FIG. 21

# A Scatter Chart

Subtitle for the scatter chart

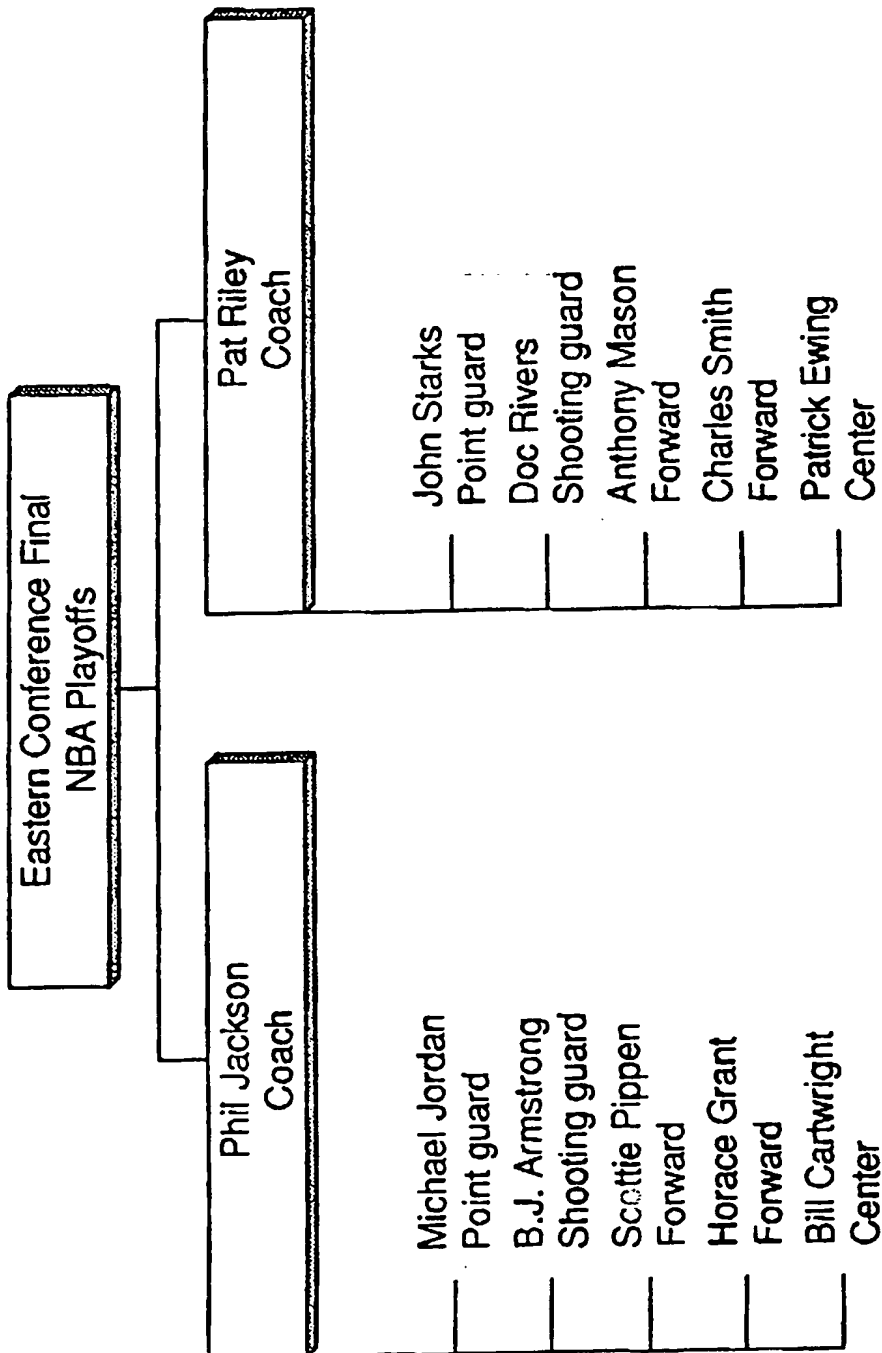


Footnote for the scatter chart

FIG. 22

# An Organization Chart

Subtitle for the organization chart

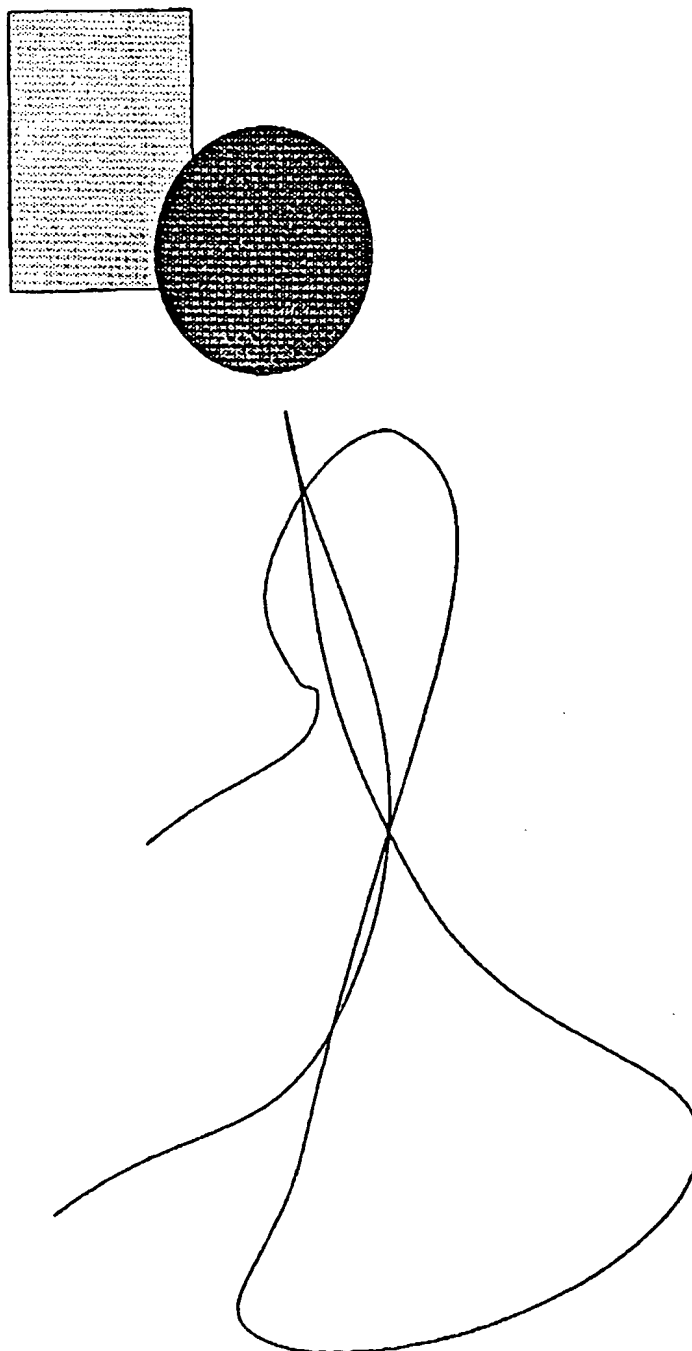


Footnote for the organization chart

FIG. 23

# A Drawing Chart

Subtitle for the drawing chart



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SUBSTITUTE SHEET (RULE 26)

Footnote for the drawing chart

FIG. 24

# A Custom Chart

Subtitle for the custom chart

- Custom charts
  - Typically have more than one chart
  - Are unique for each customer's situation
  - Can get messy if you add too much detail
  - Make great party favors

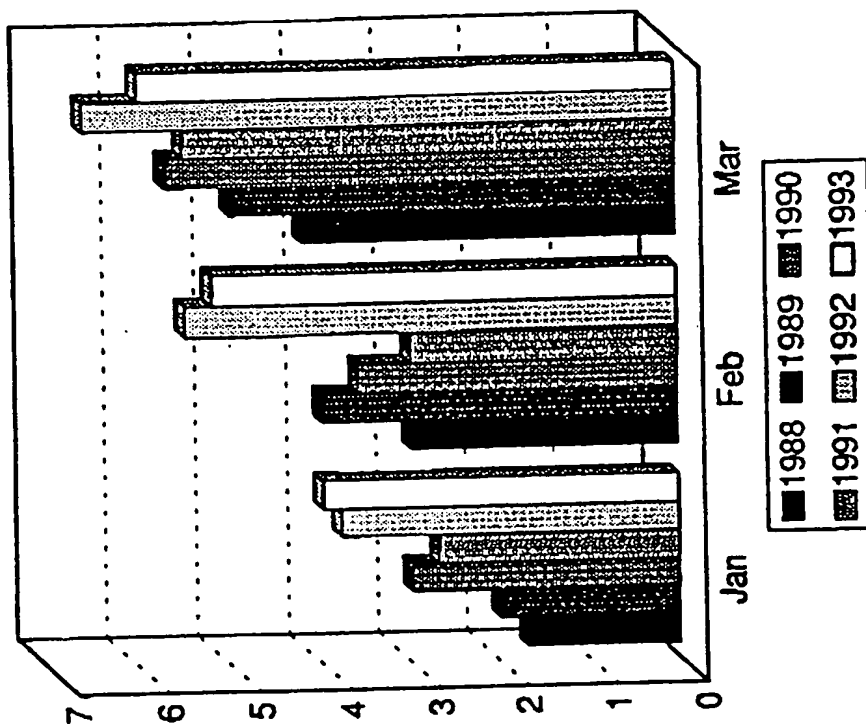


FIG. 25

Footnote for the custom chart

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 5 G06F3/023

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 5 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	IBM TECHNICAL DISCLOSURE BULLETIN vol. 34, no. 10A , March 1992 , NEW YORK US pages 300 - 301 XP302310 'DYNAMIC INFORMATION HELP PUSHBUTTON' see page 300, line 28 - page 301, line 5	22-24
Y		1, 15, 16, 24-28
X	COMMUNICATIONS OF THE ASSOCIATION FOR COMPUTING MACHINERY vol. 36, no. 4 , April 1993 , NEW YORK US pages 83 - 99 XP355424 NIELSEN J. 'NONCOMMAND USER INTERFACES' see page 95, left column, line 6 - middle column, line 4	4
Y		1, 15, 16

☒ Further documents are listed in the continuation of box C.

☐ Patent family members are listed in annex.

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- \* & \* document member of the same patent family

Date of the actual completion of the international search

4 October 1994

Date of mailing of the international search report

1 9. 10. 94

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# INTERNATIONAL SEARCH REPORT

Patent Application No

PCT/US 94/06391

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	PATENT ABSTRACTS OF JAPAN vol. 13, no. 98 (P-840)8 March 1989 & JP,A,63 280 317 (NEC) 17 November 1988 see abstract	24,25
A	---	17-19
Y	IBM TECHNICAL DISCLOSURE BULLETIN vol. 34, no. 7A , December 1991 , NEW YORK US page 391 XP255646 'DYNAMIC INSTRUCTION TITLE LINE' see page 391, line 23 - line 33 -----	26-28

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